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by Nathaniel Saltsbury

February

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by Nathaniel Salisbury — Menacingly the moon hung over the tide-swept earth . . . closer it approached . . .

The Wreck of the Asteroid 710
(In Three Parts—Conclusion)
by Laurence Manning — Besieged in their last stronghold they waited . . . thirst tore at their vitals . . .

Science Questions and Answers 733

The Reader Speaks—Letters from Readers 734

On the Cover This Month

taken from the unfinished story "The Moon Doom" by Nathaniel Salisbury we see the moon swiftly approaching the earth. New York, swept by great tidal waves, lies submerged. Ocean liners are carried over the city helplessly crashing against the large buildings.

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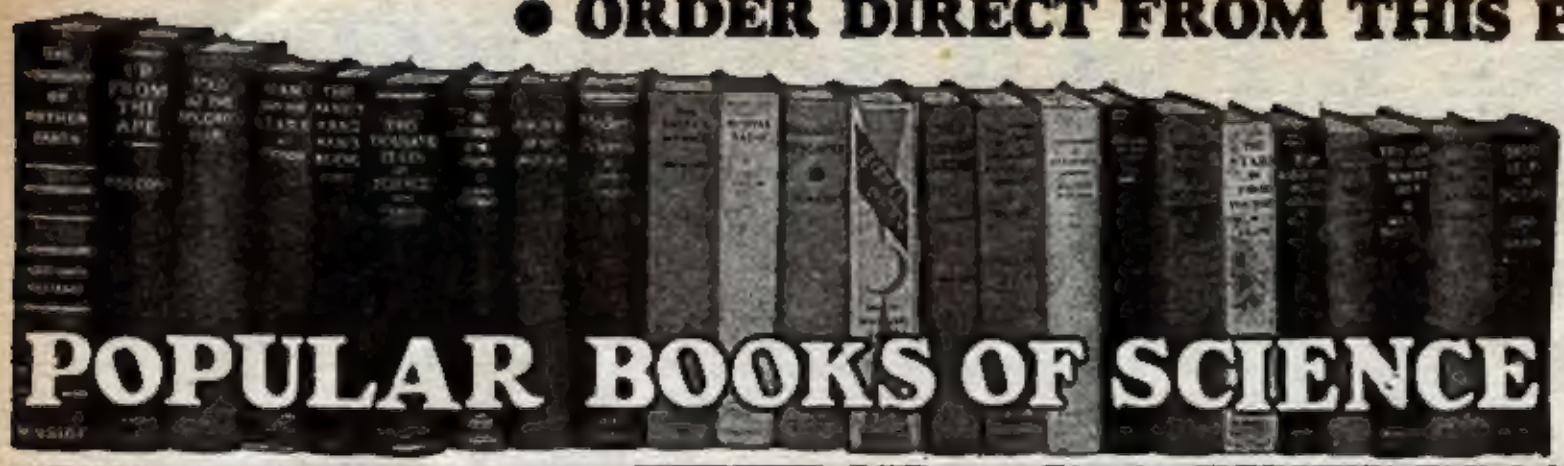

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EDITORIAL PAGE

FEBRUARY, 1933

Volume 4 Number 9

WONDER Stories

HUGO GERNSBACK
Editor-in-Chief

DAVID LASSER, Managing Editor
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C. P. MASON, Associate Editor

WONDERS OF INTELLIGENCE

An Editorial by Hugo Gernsback

● Intelligence is, generally speaking, a most difficult thing to define.

As applied to the human being, however, it is comparatively easy, but when one draws parallels between the human and "lower" animal world, one may not be so sure of one's ground. Like all other things, intelligence is relative. A human being, let us say, a professor of mathematics may represent a high type of intelligence. Yet, if he is compared with the ant or bee, it is difficult to say who is more intelligent, the professor or the insect. It is simply a matter of the point of view, for both human and insect may be termed highly intelligent because both perform intelligent acts.

Among the ants, for instance, we find a host of intelligent endeavors. Thus, for instance, we have agricultural ants; we have paper-making ants; we have ants who raise mushrooms; ants who are gardeners and who are engineers; ants who are firemen and many others. It will not do to say that because the ants do not build skyscrapers, or know how to turn out radio sets that they are one wit less intelligent than the human being. Perhaps it is the other way around, ants do not need radio sets; and there is no gainsaying that the insect is in many cases quite as intelligent as the human.

Those who have made an earnest study of ants and bees will no doubt agree that their form of government, for instance, is better than that of men, and it is foolish to make the observation that whatever the insects accomplish is due primarily to their instinct. They certainly did not always have the same instincts. Evolution changes instinct, and when the first ant or near-ant was born hundreds of millions of years ago, it certainly did not come equipped with the instincts of the present-day ant. Instinct and intelligence are closely linked, and one seems to be dependent upon the other.

Despite our much vaunted intelligence, so far, we have not succeeded in establishing communication with either the ants or the bees, or for that matter, with most other animals. Their "minds" are completely closed to us, and until we have succeeded in understanding them by making direct communication with them—fantastic as such a proposal may seem—our effort to understand their intelligence will be nil.

There is not the least reason to doubt that ants and bees have a very fine communication system between themselves, far better than humans have. Inter-communication is certainly instantaneous throughout their hives between the various members. It should be possible, therefore, in time to come, for us humans to be able to seriously consider communication with them, and when it happens our surprises will be many.

To begin with, the ants and bees are millions of years ahead of us in their evolutionary scale, and the chances are overwhelming that they know a lot more than we do. This knowledge will no doubt benefit the human race more than we can even discern today.

The same reasoning should be used in our contemplation of other planets. If any life is found on such older worlds as, for instance, Mars, the chances are not one in a million that those beings are the same as humans. Yet, their intelligence may be tremendous as compared to ours. We might not be in a position to communicate with them, which means exchanging intelligence. We might stay in their midst for years, and still not know what it was all about. It would be the same as if a scientific explorer were suddenly reduced to the size of an ant and put in an ant hill. Providing that he was not killed immediately, he might stay with the ants for years and yet not be able to communicate with them. The best he could do would be to observe them and their habits. That we have already done. But still, we have not progressed one iota beyond that point.

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The station in space had been torn, somehow, out of its orbit around the earth, and sent hurtling into the unchartered regions of outer space. The doomed sphere was drawn into the nucleus of the comet, there to disappear.

THE ETERNAL DICTATOR

By NATHAN SCHACHNER

● In his absorbing play, "Back to Methuseleh," Bernard Shaw shows what a terrific waste of human energy arises from the shortness of our lives. It is only when we begin to acquire mature wisdom, Shaw points out, that the three score and ten years have passed, the human being dies and his marvelous brain is no more. If men could live for two hundred years they might really learn a few things, especially how to solve some of the terrific problems of society.

Mr. Schachner has taken that idea as his theme for this thrilling story. He poses the problem—what would happen were one man granted, by fate, accident, or design, a stretch of life far beyond that of other men? Would he come eventually, by his far superior wisdom, to rule the earth? And if so what would be the conflicts that would come between him and his "childish" subjects? A fascinating idea, carried out in this stirring tale.

● Captain Denny Kels, of the Rocket Patrol, 3rd Flight Squadron, stared thoughtfully through the hull-port at the upward rushing field.

"Two bursts on the retarding rockets," he said mechanically to his second in command.

"Very good, sir."

Nick Davenant ran skilful fingers over the gleaming control board. Thin jets of flame spurted out of the bow tubes, spread fanwise until the great rocket cruiser was completely enveloped in burning gases. The ship decelerated swiftly, dropped into the cushioned cradle of the landing field with the tiniest of jars.

"Take over, Nick," Kels snapped. "I'm reporting to His Eternal Majesty."

Already the ground mechanics were swarming over the hull, fastening the cruiser down to its cradle with great cables, polishing and repairing the atmosphere-pitted surface.

"Very good, sir," Davenant replied formally. Then he relaxed, curiosity peeping out of his naïve blue eyes, shining on his somewhat rotund face.

"I'd give a good deal to know what the Old One wants with you, Denny," he remarked.

"I've been thinking about it ever since the visiphone pulled us off the Sahara patrol," Kels acknowledged frankly. "It has me worried. Melius doesn't see any one except members of his Council."

Davenant puckered up the smooth skin on his forehead.

"If history doesn't lie," he began, "the last time—"

"Was seventy odd years ago when he ordered the leaders of the rebellion brought before him in person."

"They never came out again," Nick said meaningly. "Say, Denny," he burst out, "you didn't run foul of his spies by any chance?"

Kels laughed shortly. "I give them a clear berth. Haven't even thought a treasonable thought, and don't intend to. After all, the world *has* been a pretty good place to live in since the Old One took over, in spite of his iron hand. For the past two hundred and fifty years every one has had enough to eat and drink, comfortable shelter, plenty of entertainment, the right to do as one pleased, provided—"

"Provided it fitted in with the rigid planning of His Eternal Majesty." There was bitterness in Davenant's ordinarily soft-spoken voice.

Kels looked at his second in command in amazement.

"What's the matter with you, Nick? Aren't you satisfied?"

"Satisfied? No! I wanted to be a poet and the physiopsych graph showed me up as a rocket flier."*

*The physiopsych graph was a strange mechanical device into which the youth of sixteen was placed, every reaction mechanically recorded and synthesized by intricate automatic calculations into the special life-aptitude of the subject. A cold blooded method of choosing one's vocation, but scientific and efficient.

Kels stared at the gloom on his friend's rotund countenance and burst out laughing.

"Thereby showing the wisdom of the Old One," he chuckled, slapping his subordinate cordially on the shoulder. "Look! You're the best rocket patrolman in the Service, barring none; and you'd have been the world's rottenest poet."

"I had genius," Nick said seriously.

Denny laughed lightly. "I'm satisfied. This is just the career I'd have chosen if it were left to me. But I'd better hustle. If I keep the Old One waiting, there'll be a new captain. Good by."

He swished the slide-port open, swung himself out into the gathering twilight of the great landing field.

Kels threaded his way over the busy field, making for the Great Palace that gleamed with soft mellow glow to the farther side. It was quite dark now. The field was pricked out with lights where rocket ships lay in their cushion cradles. Kels glanced upward. In the southeast heavens, overlaying the ecliptic like a great shining Damascene sword, flamed a comet; Kyle's comet! Its huge misty brilliance paled the very moon that hung, crescent-shaped, near its nucleus. And even as Kels stared, a thin silvered streak etched its way across the pale blue of the sky, was swallowed up momentarily in the glare of the comet and reappeared to continue on its ordered revolution around the earth.

Kels nodded to himself. Many times had he hurtled a supply ship over the intervening distance to contact that eternally rushing Station in Space; to replenish food, air, supplies, for the immured scientists who

scanned the black heavens to the greater glory of science.

Three hundred years before, in 2232, the Station in Space, a huge cylinder of shining aluminum, the third of its kind, had been carefully rocketed to an altitude of five hundred miles, there to attain a level velocity of five miles per second, and encircle the earth eternally like a minor satellite, completing its orbital revolution in 1¾ hours. With clock-like regularity it sped on its appointed course, advancing immeasurably man's knowledge of the sun, the planets and the stars, cosmic rays, and meteorological conditions on the earth beneath.

The third of its kind! Kels stopped short, forgetful of his appointment with the dread Dictator. The first, a crude experiment launched in 2224, had crashed back in meteor-like destruction. But the second, two years later, had been successful! He swore softly under his breath. Kyle's comet! He had almost forgotten.

● Gordon Kyle had lived in the twenty-third century. History cited him as a great physiological chemist who had gone up in that second successful Station in Space to perfect some secret experiments. The comet had flamed then as now, a strange visitant from interstellar space diverted from its original parabolic orbit by the huge mass of Jupiter.

The great comet swept close to earth, barely missing the moon, enswathing earth and satellite in its wide-curving tail. Its solid nucleus, rare in these celestial visitants, caused violent perturbations, fortunately not of a serious disruptive nature.

But the Station in Space, enclosing Kyle and his associates, had somehow been torn, in spite of its corrective rockets, out of its orbit around the earth, sent hurtling into the uncharted regions of outer space, where no rocket ship had penetrated before or since. Horrified beholders, eyes glued to powerful telescopes, had seen the doomed space-sphere drawn irresistibly into the nucleus of the comet, there to disappear.

Three hundred years had elapsed. Twice the comet returned in its new orbit, each time at a respectably safe distance from earth. This was its third visitation. According to calculations, it would once more pass near the earth and the moon.

But these facts were common knowledge. What had brought Kels up sharply were certain scattered hints from his own childhood. He remembered them now; for the first time they clicked into coherent form.

Gordon Kyle was his many times removed great grandfather! For some reason Kyle's wife and child had fled secretly after the tragedy, changing their name to Kels. In new surroundings, no one knew of their relationship to the distinguished scientist. But the secret had been handed down from generation to generation in a singularly close-mouthed family.

Furthermore, he remembered, Vincent Melius, His Eternal Majesty, by whichever name you wished to call him, had been a close friend of Gordon Kyle! A distinguished physiological chemist in his own right, he had been a participant in the secret experiments of his friend!

He had been in his sixties at the time of the disaster, yet somehow the man kept on living. Mortality, the inevitable heritage of the human race, did not seem to touch him. It was gradually bruited about that he had discovered the secret of immortality; but he maintained a discreet silence—and kept on living.

It was inevitable that Vincent Melius, the seeming immortal, should gain greater and greater influence in a world of flux and change.

In the year 2304 came the last great war. Whole peoples perished in the universal disaster, civilization staggered under repeated blows. It was inevitable again, in the drear days of salvage and reconstruction, that Melius, changeless, vigorous and hale in spite of his years and accumulated knowledge, should have been turned to as a haven of peace and safety.

Melius became dictator of the world. Under his strong, ruthless administration, mankind pulled itself out of the slough, became the ordered, planned world of today. Three hundred years, and Melius was still alive, still Dictator, more ruthless, more strong, than ever.

Frowning thoughtfully, Kels resumed his swinging stride toward the round-domed luminescent Palace. A guard stopped him with sharp challenge. Kels gave his identity number, and the nature of his mission. The guard switched the radiophone from his light steel helmet to his mouth, spoke low-voiced into it. Silence then, while the message was relayed through the Palace.

A green light gleamed suddenly on the front of the great smooth portal. A guard flashed a hand ray on the glowing circle; the clashing colors blended and faded. A smooth section slid silently open.

"There you are, sir," he remarked with a side-glance of curiosity.

"How do I find my way?" Kels inquired.

"Just follow the moving illuminated arrow on the left wall and you'll be all right. Don't attempt to try any other passage."

Kels smiled grimly. "No fear. My orders are to see His Eternal Majesty, and I know how to obey orders."

Kels was in a narrow, smooth-walled passageway, illuminated with cold light. A luminous arrow gleamed white against the brown-red of the wall, quiescent. As Kels stepped over the threshold, the arrow commenced a slow gliding movement along the wall.

Kels followed. He had no difficulty in keeping even pace with the moving pointer. Through twisting corridor after corridor he followed the gleaming arrow, meeting no sign of life in the lonely echoing halls. Then the arrow came to a quivering rest, pointing steadily toward a cul-de-sac. No further progress seemed possible. Kels stopped short and waited.

● A voice filled the passageway with startling sound, booming, mechanical.

"Your identity number."

"K 44381," Kels said slowly.

"Have you weapons upon your person?"

"Yes."

"Remove them, and lay them on the table to your left."

Obediently Kels slid out of their holsters his long-barreled dynol pistol and short-range spray-gun, deposited them on a low steel section that had glided transversely out of the wall. The section moved back into its recess, and vanished with its lethal freight.

The blind curved wall in front of him glowed suddenly, and Kels was bathed in a pale green light. Looking down he was astonished to find himself a pale transparent wraith, in which the bony skeleton showed dark articulations, and roundish blobs gave evidence to metallic substances embodied in his clothes.

Kels smiled to himself. The invisible Dictator was taking no chances!

The glow died away gradually, and the curving wall seemingly faded into nothingness.

"Enter." the booming voice commanded.

Kels walked steadily into a small, completely enclosed chamber. Smooth, blank walls confronted him in every direction, even the section through which he had entered had closed. There was no furniture, no equipment of any kind in the bare room except for a tall-backed, deep-seated leaden chair standing four-square on a raised dais in the center of the chamber.

A man was seated in the confines of the peculiar chair of lead, his head back-tilted, his face and body bathed in streams of bluish radiance that emanated from a glassite oblong inset in the metallic ceiling overhead. The impact of the rays on the man and on the dull lead of the chair set up little dancing sparkles that dazzled like a million fireflies in rapid shifting flight. At the same time Kels was aware of a low continuous droning sound and the peculiar tart smell of ozone came to his nostrils.

The man slowly down-ended his coruscating, light-invaded face and Kels felt suddenly uncomfortable. An iron-gray upthrust shock of hair and close trimmed grayish beard contrasted oddly with the smooth, wrinkleless fresh-colored skin of cheeks and forehead. It seemed as if a child were wearing a wig and false whiskers to frighten his comrades, or a slippered grandfather had sportively encased himself behind a youthful mask.

But the deep-set, burning eyes that seared into Kels' very vitals belied either interpretation. Age-old knowledge clashed harshly with regal arrogance, with indomitable will, with the veiled bitterness of one who has seen comfortable death pass by these wearied tenements. Kels felt instinctively that Melius the First was not at peace with himself, that constant warfare raged within those strangely youthful fleshments.

Then the Dictator spoke, his voice passionlessly cold.

"Captain Kels, you have contacted on several occasions the Station in Space."

"Yes, Your Eternal Majesty, many times."

Those strange eyes bored into Kels.

"Your record in the service as a fighter has been a good one."

Kels kept modest silence, wondering uneasily what it was all about.

Melius stared thoughtfully up at the glowing source of the radiance, his face aflame with dancing sparklets. Kels shifted his weight from one foot to another.

The Dictator lowered his head abruptly.

"You will contact the Station in Space at dawn with your rocket cruiser. .Transfer provisions and supplies for a month's needs." He leaned forward a trifle, and Kels was astonished to notice the white grip of the knuckles on the leaden arms. "You will also dismount the cruiser's guns, trans-ship them to the Station, and remount them in the telescope-ports. Keep only four electelescopes in action, so as to command a continuous sweep of the heavens.

"Transfer your crew to the Station, and return the present Station contingent to earth in the cruiser. You will be in sole command and strictly responsible for unquestioning obedience to my orders. Secrecy is essential!"

Gone was the passionless coldness; every word vibrated with the intensity of repressed passion.

"You will maintain unceasing watch of the heavens. Any strange body approaching the earth, be it meteor, fragment of planet, space-sphere, or rocket-cruiser, is to be destroyed on sighting. Do not wait for identification, do you understand?"

"Yes, Your Eternal Majesty," Kels said bewildered, "but—"

"There are no 'buts'," Melius interrupted harshly, "those are my orders and they must be obeyed."

Kels clicked his heels together and saluted.

"Very well, sir," he said formally.

Something of relief flitted over the child-like mask; the eyes relaxed their savage expression. Melius condescended to explain.

"I have received information, Captain Kels, that our earth is about to be invaded by strange denizens from outer space; their mission—to destroy the earth. Their weapons, their vehicle, are unknown. It is essential, therefore, that you do not wait to identify any strange body approaching the earth; blast it out of existence before you yourself are annihilated. You need have no fear of making a mistake. Earth traffic, except for the Station and contacting cruisers, does not pass above the fifty-mile level. As an added precaution, warnings are being broadcast to keep all vessels within the ten-mile level until further notice. That is all."

Kels bowed and walked steadily out of that strange bare room with its humming, drumming sound, ozone odors, and the strange radiance-bathed figure of Melius the First.

The door slid into blank smoothness behind him; the illuminated arrow awaited him with quivering restlessness in the corridor, its direction reversed. His weapons lay on the outthrust steel stand. As he buckled them on, his mind was a chaos of questions and emotions.

Had the strange beating flame on Melius something to do with his immortal youth, impregnating him with a phoenix-like emergence from the ordinarily inevitable decays of time? And why this strange, secret interview—the breaking of a centuries-old rule? The orders could have been transmitted by visiphone just as readily. And these enemy invaders from space! Where were they coming from; how had Melius received his information? These and a thousand other questions clamored for answer. As the arrow started its even backward trek, Kels shrugged and gave it up. He was a Patrolman, and a Patrolman's first duty was to obey orders unquestioningly.

CHAPTER II

The Mission Starts

● Nick Davenant met him with eager relief on his honest countenance.

"Thank God, Denny!" he burst out. "I had given you up for lost. What did the Old One want with you?"

"We're contacting the Station in Space at dawn," Kels disregarded the question. "Lay on a month's supplies, examine our long range guns, make sure they are in perfect working condition, and break out ammunition."

Surprise flitted over Nick's countenance, then he saluted his superior smartly.

"Very good, sir."

An hour before dawn the cruiser was roaring perpendicularly skyward, supplies neatly stored on board, every gun ship-shape, ammunition brimming in the automatic feeders, every member of the crew spruce and alert. Nick Davenant moved about sullenly, barking unwontedly harsh commands at inoffensive subordinates. He was hurt at Kels' reticence, and showed it.

But his superior was not paying any attention to his sulky attitude. His eyes were glued to the visiscreen, scanning the heavens for the first sign of the Station in Space. It was due over the western horizon in half a minute. To the southeast blazed Kyle's comet, hugely curved, its planetoid nucleus surrounded with concentric radiances.

A tiny silver cylinder arched over the left edge of the visiscreen, crept slowly across the luminous surface. Kels waited until it crossed a coordinate hair line, snapped levers on his space-dimensional calculator. The answer gleamed redly back.

"Three bursts on the port rockets at ten second intervals," he commanded, "Accelerate two gravities on the stern rockets."

Davenant complied, still brooding over his fancied wrongs.

The cruiser swerved and leaped in a swift tangential arc, rushing through space to its appointed rendezvous. The Station in Space was flashing now across the velvet backdrop of the sky glittering in the unobstructed sun.

Kels jockeyed his cruiser until it was immediately alongside the cylinder, flying parallel with it, and at an equal rate of speed. To observers in the ships, it seemed as if they both were motionless, adrift in space.

"Magnetize contacting plates."

A surge of induced current, and the cruiser swung gently closer, until with barely a vibration the two vessels contacted and continued on their swift orbit, firmly bound together.

"Prepare Airlock No. 1, open exit-port."

"Now, Nick," Kels turned to his still sulky second in command, "dismount four spray guns and six projectile rifles ready for transferance to the Station. Also full complement of munitions, supplies and oxygen tanks."

Enjoying Davenant's open-mouthed amazement, he stepped quickly into the air-lock, passed through the exit-port into the similarly opened port of the Station.

Captain Emmett, grown gray in the Service, now assigned to the soft berth of the Station, shook his hand warmly.

"This *is* a surprise, Kels," he greeted. "I hadn't expected supplies for another week. And since when has a rocket-cruiser of the Patrol been impressed into Supply Service?"

"I'm taking over," Kels said briefly. "You are to take my ship back to the landing field with a skeleton crew, and all of your scientific complement."

Emmett stared at the younger man from under bushy brows.

"What kind of a jest is this?" he demanded angrily.

"Orders from His Eternal Majesty," Kels retorted coolly.

"I didn't—" He broke off at the high whine of the visiphone.

Still purplish, he adjusted the private phones to his head, switched on the screen. The luminous surface remained blank, but Kels could hear the blurred buzzing in the receiver.

Captain Emmett's jaw dropped as he listened.

"Yes, sir," he intoned respectfully, and snapped off the current.

"That was the Chief," he said unwillingly. "I just got my orders. Sorry."

"That's all right," Kels said cordially. "We start shifting at once."

Emmett scratched his head.

"What's the big idea?" he asked curiously.

"Orders from His Eternal Majesty," Kels repeated laconically.

"Oh!"

That was all. Emmett knew that no further questioning was permitted.

It did not take long to effect the shifting of personnel and cargoes. Kels shook hands cordially with Captain Emmett, locked the exit-port, shut off the magnetic current, and saw the cruiser he had commanded sheer off under infinitesimal discharges. A last waved good-bye through the viewport, and in a flashing acceleration of gleaming steel and flaming surges of gas, the cruiser darted downward to the earth.

Kels stared after it, wondering if he ever would contact with the good old earth again. There was something he did not like about this mysterious adventure he had been ordered on; a good many things that did not quite ring true.

A bitter voice broke in on his meditations.

"What are the Captain's orders?"

● Kels wheeled and slapped his aggrieved subordinate genially on the shoulder.

"Lots of them, Nick," he grinned. "First you're to dismount all telescopes except those at bow and stern, and one to port and one to starboard. Mount our trans-shipped guns in their places, spray and projectile alternately; see that ammunition is supplied for each, and pipe the crew to battle stations, in four-hour watches."

"The hell you say!" burst involuntarily from Davenant, forgetful of his aggrieved dignity.

"Exactly," Kels agreed. "Sorry I had to keep you in the dark but those were orders. Now that we're irrevocably cut off from earth; forever, I'm afraid; there's no further need for secrecy." And he related in detail his strange interview with Melius the First.

Davenant heard him through with a mounting whistle of astonishment.

"The Old One's sure got something up his sleeve that he didn't want you or anyone else to know about," Nick commented at the end of the narrative.

"Certainly; but what? That's what's bothering me. We're the goats for some particularly smelly affair."

Nick looked at him queerly.

"You don't believe that story about invaders from space."

"No, I don't," Denny responded frankly. "Melius would have impressed every Patrol ship into service. In speed, armament and maneuverability they have it all over this tub on a practically immovable course. And there are hundreds of cruisers."

"They can't maintain this height for long."

"Granted. But what difference would it make if they patrolled the fifty-mile level?"

Davenant fell silent.

"Another thing," he said finally, "why the insistence that you fire at everything without waiting for identification?"

"To protect our own lives," Kels countered sarcastically. "The Dictator has gone soft after all these years."

Nick made a grimace, stared out of the glassite port at the slashing scimitar of the comet.

"I wonder—" he said softly.

"What?"

"Oh, nothing," Nick returned elaborately.

"Then get busy on your duties, you lazy hound," Kels pretended anger.

"At once, Captain. And another thing—I'm examining the earthward corrective rockets to make sure they're in working order."

"What the devil—" but Nick had fled, and in the press of swift duties, Kels forgot Nick's enigmatic conduct.

The crew, trained fighters every one, worked with disciplined precision. The electelescopes slid out of their long-barreled ports; long, sleek snouts bristled out of the Station in defiance of the universe. The projectile guns shot armor-piercing shells filled with dynol, the most powerful explosive known to man. The spray guns, angling outward like inverted cones, sprayed over a wide area thousands of tiny silicious pellets, each filled with liquid *arnon*, a combustible fluid that burnt inextinguishably through every element, compound, alloy or combination of metals except the silica in which it was encased.

Munitions were fed into the automatic hoppers, and the first watch took their battle stations, ready for the unknown enemy that was to descend upon them from the fathomless reaches of space.

"We'll each take charge in four-hour watches," said Kels. "You can catch up on some sleep now if you wish, Nick."

"Not me. I'm wide awake. I'll watch this first one with you."

The remaining telescopes threw their field of vision on the visiscreen, under button controls. Kels solved the problem of perpetually pressing buttons by attaching a circuit breaker, so that each field flashed on automatically for five seconds, and then yielded to the next. Thus he was able to view the entire span of the heavens from the comfortable recesses of his chair without moving a finger.

They were circling swiftly around the earth, maintaining an even pace of five miles per second, distance of five hundred miles, accurate as a fine chronometer.

Below, the green and white earth, hugely spherical, turned in slow majesty. Continents and oceans showed clear-etched on its convex surface. Kels noted with fascination the birth of clouds, from tiny specks no bigger than a hand, to great, sullen-bellied masses that obliterated vast sections of the whirling orb. No wonder meteorology had become an exact science with the advent of the Station in Space.

But Kels' interest lay in the outer heavens. That was where the invading peril was to come from. The moon gleamed queenly white, the sun was a molten hole in the pitchy black of space, the stars were white radiances. But Kyle's comet overshadowed everything else with its magnificence. The vast sweep of its glowing tail overlaid at least twenty degrees of arc; its solid nucleus was over 100 miles across. A sizeable planetoid in its own right!

The comet was curving toward the earth at cosmic speed. In two more days it would approach its closest, about 150,000 miles distant. Then it would curve away, rushing around the sun and flinging out again on its orbit past Jupiter.

In two days, slight corrective rocket discharges would have to be employed, to counterbalance the outward tug of the comet's nucleus. Kels paused abruptly in his lucubrations. Now what the devil had Nick meant by his last remark about the rockets? He glanced over at his subordinate, but that worthy was placidly chewing on a sandwich.

● The day passed without incident. Nothing alien drifted into the field of the telescopes, not even a stray meteor. Watch followed watch with yawning regularity.

The next day however, Kels was dozing on his off trick when Davenant yelled. Instantly he was on his feet, wide awake, the crew sprang to their stations, alert, eager for anything to break the monotony of their peaceful existence.

"What is it?" Kels cried.

Nick grinned sheepishly.

"Only a blasted meteor," he apologized. "It looked at first like something interesting." He pointed to the visiscreen, on which a tiny rounded object was speeding away from the comet in their general direction.

"Meteor or not," Kels responded briskly, "you know what our orders are."

He raised his voice. "Man the starboard projectiles." He squinted at the tiny moving blob, watched it cross a hair-line. Then he entered its coordinates on the space-dimensional calculator, threw in allowances for distance, velocities of meteor and of dynol projectiles, shifted and obtained the answer.

"Sight plus 22 deg. 11′ 35″ Plane Alpha; plus 2 deg. 4′ Plane Beta; minus 6 deg. 13′ 5″ Plane Gamma."

The great projectile guns moved smoothly in their revolving slots until the crosslines bisected the muzzle dots. Kels watched the chronometer cylinder.

"Fire!"

There was a deafening roar; the space cylinder recoiled violently under the impact of the broadside.

"One burst on Rocket No. 6."

A flaming spew of gases to port, and the Station righted itself on its normal path.

But Kels and Davenant were absorbed in the spectacle of the speeding dynol projectiles. The huge shells fled parallel through space, following a calculated arc. The meteor grew slowly on the visiscreen, its path angling toward that of the missiles of destruction.

It would take fifteen minutes for the paths to intersect, or show a definite miss. Even the disciplined crew cast excited glances in the direction of the screen. As for Kels, he was positively breathless. Never before had he been called upon, or anyone else, for that matter, to attempt bombardment at such vast distances. The meteor, if such it was, was all of 35,000 miles away! A speck in infinity, and other specks playing tag with it! It was an impossible shot!

The minutes passed, breathless, tense. The dots on the visiscreen crept onward, closer. Then, a great cheer burst involuntarily from the men. Three of the four projectile dots impinged on the larger sphere; the fourth passed an infinitesimal distance away, to plunge on into uncharted space!

At the impact of the dynol pellets, the meteor seemed to lift and shatter soundlessly into a rain of tangentially flying fragments. Such was the power of dynol!

Kels and Davenant shook hands solemnly.

"I never believed it possible," Nick's round face held awe. "The best we've ever done before was not over a hundred miles."

"But that was in the stratosphere," Kels objected. "Air resistance is a tremendous factor. Besides, we never needed greater ranges."

The visiphone burred. Kels adjusted his headgear, tuned in. The Chief's voice sounded.

"Flashes seen from Station in Space. What happened?"

"Pursuant to orders we—"

The wave scrambled into a medley of roars. Then suddenly the ether cleared and a new voice came hurtling on a tight wave. It was the Dictator himself.

"You are to report only to me hereafter, Captain Kels," the passionless voice said coldly. "You may tell your story now."

"Pursuant to your orders, Your Eternal Majesty," Kels began, "we fired at an object seemingly coming from the direction of Kyle's comet."

A perceptible pause.

"With what result?"

Kels could not keep the exultation out of his voice.

"Three out of four dynol projectiles scored direct hits and blew it to smithereens."

"Did you identify the object?"

"Yes, sir, it was a meteor."

There was menace in the cold even tones.

"You have disobeyed orders, Captain Kels. You were told to fire immediately on sighting. If you had done so, you could not possibly have identified the object. Let it not happen again."

"Y-yes, sir," Kels stammered. A vast resentment surged within him.

"Tomorrow," the inexorable voice droned on, "the invaders are expected. Destroy every object on sighting. Allow nothing to slip by, no matter what it seems to be. Your life depends on your prompt obedience to instructions. Do you understand?"

"Yes, sir," Kels answered as coldly.

The visiphone abruptly clicked off.

Kels turned in seething rage to face a grinning subordinate.

"You don't seem any too pleased with the acceptance of your report."

Kels almost exploded. "The Old Tyrant!"

"Ssah," Nick warned him with a significant side glance at the crew. "There may be one of his spies planted. Be careful what you say."

Kels calmed down immediately. "You're right. But it's getting more and more mysterious. I get hell for saying I recognized the meteor as a meteor, and then I'm told the invasion is all set for tomorrow."

Davenant whistled tunelessly. "That's when Kyle's comet approaches closest to the earth."

Kels stared at his friend. "What about it?"

"Nothing." Nick moved off. "I'm taking another look at the corrective rockets." And he was gone.

Kels frowned thoughtfully. He was beginning to piece things together.

CHAPTER III

The Dash to Earth

● The following day, the Station in Space seethed with excitement. Every sense in the swift rushing cylinder was strained and alert. The crew snapped to their stations like unleashed hounds. There was no question of watches now. The full complement was on battle duty. Enemy invaders from space were on their way to destroy the earth. That news had finally disseminated to the personnel. Kels and Davenant sat constantly before the visiscreen, scanning every inch of that illuminated surface for the first sign of alient objects out in space.

Kyle's comet was easily the most spectacular object in the heavens. Its nuclear planetoid glowed with an orange flame, the tremendous arced tail already held both moon and earth in its tenuous embrace. Kels knew the space cylinder was likewise enswathed, yet so near vacuum are comet's tails that it interposed not the slightest opposition to the Station's rush.

Fortunately, at the point of nearest approach, the nucleus was on the opposite side from the moon, otherwise there might have been a disastrous collision. In half an hour the great comet would be closest, then it would veer away.

The Station felt the gravitational tug, but slight bursts on the corrective rockets kept it on an even keel.

Round the earth the fascinated watchers sped, then back again to see the nucleus rising swiftly from beyond the earth's curving rim, swinging aloft and over them.

Davenant watched the chronometer with strained attention. The split seconds registered on the moving electrical cylinder. Nick shifted his gaze suddenly. It was the second of closest approach. The planetoid showed round and orange-glowing on the upper right of the visiscreen.

Kels followed his gaze. There was breathless silence. Then Davenant sucked his breath in sharply. A tiny dot, so tiny that it was only a moving pinpoint of silvered light, disengaged itself from the outer rim of the planetoid, glowed faintly in the orange coma, then seemed to move slowly, yet actually with tremendous velocity, out into the blackness of space.

Kels galvanized into life. His fingers pushed lever after lever on the calculator.

"It's an impossible shot, but orders are orders."

The answer showed split seconds of arc on the planes of sight.

Kels groaned.

"We'll try it anyway." Nick smiled queerly and held his peace. The guns sighted as well as they could, and roared full broadside. Then they settled down to watch the hurtling projectiles.

Half an hour later it was obvious there would be no contact. The fast-moving object was still too far away to determine what it was, but there was no doubt it was heading squarely for the earth.

The Station in Space was moving around the earth's rim when Kels let loose another furious broadside. Then the bulk of the spinning world obscurred further observation. It would take three quarters of an hour for them to speed around the farther side, and come into sight of the comet again.

"I don't believe I hit it," Kels said quietly.

"I'm positive you didn't." Nick assented.

Kels looked at him strangely.

"Any idea what it was?"

"Not an idea."

"Neither have I."

And each knew the other was lying.

Never did prisoner wait more anxiously for a last minute reprieve than did the crew of the Station in Space wait for the rising of the comet over the earth's convex horizon.

At last the nucleus came up like a wan edition of a tiny sun. Every eye raked the screen for evidence of the strange body.

Then someone in the crew, forgetful of all discipline, groaned aloud.

"Missed, by the nine moons of Jupiter!"

There was no mistaking the shining vessel now. It was a space ship. It was now some twenty thousand miles away, and traveling fast toward the earth. The dynol shells had vanished, lost in the vastness of space.

Kels' face set grim and hard. He performed rapid calculations.

"For God's sake, Denny," Nick cried out in alarm, "what are you going to do?"

"Do? Obey orders!"

Davenant caught hold of his hand. He was literally trembling with excitement.

"Don't do it!" he implored. "Let it go. Fire if you must, but make sure you miss. That space ship must not be harmed."

Kels shook off his friend's restraining hand.

"You must be mad," he said coldly. "My orders are explicit and admit of no argument. You as a Rocket Patrolman should know better."

"Denny, that ship out there is—" Nick glanced around wildly, saw the crew listening avidly at this quarrel between their officers. He stopped short, controlled his voice with a violent effort, spoke low.

"Miss it, Denny, for God's sake, miss it. The future of the world depends on your missing. Don't you see, it's a *space cylinder!*"

"I realized that some time ago," Kels said surprisingly. Underneath the surface he too was fighting a battle, a battle of all the finer instincts of his nature against the trained Patrolman.

"I'm sorry, Nick," he burst out, "but I must shoot, and shoot for the mark."

● Davenant wrestled suddenly with him. "Then I must stop you." The round face was white with strained determination.

Kels was taken by surprise. "Mutiny," he gasped, staggered under the impact, then recovered himself and exerted all his superior strength. He disdained to call for help from the startled crew.

It did not take him long to overcome the slighter man. Arms pinioned helplessly behind him, Nick lay panting and glaring.

"Put Lieutenant Davenant in irons to await my disposition," Kels called. "And remember, none of you have seen anything; understand?"

"Aye, aye, sir," his men chorused. They knew the penalty for such conduct as Davenant's. Nick was pushed gently into the little cubby hole infrequently used for mutineers.

The space cylinder was distinctly visible on the visiscreen now. It was only 20,000 miles away.

Kels reperformed his calculations. He was surprised to note how his hand trembled.

The crew were stationed at their guns. He gave the necessary sighting directions.

"Fire!" he commanded in a steady voice.

Out leaped the projectiles like live things; the Station rocked and roared with the vibration. In ten minutes the paths would intersect.

Kels found himself in a welter of emotion. The shots had gone true, he knew, yet he found himself tensely wishing that they would miss. What manner of beings were in that far off shining cylinder?

Minutes passed. There was no doubt in his mind that there would be direct hits, and his flesh crawled at the thought.

The strange behavior of Melius, the even stranger excitement of Nick Davenant, the invading vessel and its point of origin, all made a confusion in his mind. He dared not pursue his thoughts to their logical conclusion.

Then, on the visiscreen, the alien space cylinder suddenly changed its course. It had seen the death-dealing missiles. Kels jumped up.

Hardly knowing what he did, carried along solely by professional instinct, he gave swift orders.

The broadside of all guns, dynol and spray, belched their hail of death in continuous bursts. The enemy ship was only five thousand miles away, within range of the far-spreading *arnon* pellets. Space was filled with a cloud of rushing missiles. It was impossible for the doomed cylinder to avoid them all.

Almost as he gave the orders, Kels repented. A cold wind cleared all the cobwebs from his tradition-saturated mind. He saw everything in blinding clarity. He was but a pawn in the colossal, ruthless game of the Dictator. And he had permitted himself to be used. Davenant had seen, and he—

Another glance at the screen. The gleaming cylinder was swerving violently, but it would do no good. All space was filled with the wide-darting pellets that burned inextinguishably. He, and he alone, would be responsible for the destruction of the cylinder.

He buried his face in his hands, unwilling to see the doom he had executed.

Cries of astonishment aroused him. The crew had deserted their stations, were staring openmouthed at the visiscreen.

Kels jerked upward, swore violently. The strange space cylinder, now only 800 miles away, shimmered bluely. Coruscating sparks played over its metallic surface in a network of flame. And the *arnon* pellets, the heavier dynol projectiles, were dividing into slanting streams, passing over and beneath and around the vessel, to plunge harmlessly into the emptiness of interplanetary space.

Kels gasped. The stranger was possessed of defensive weapons superior to those known on earth. He had surrounded himself with a magnetic field of such enormous strength as to deflect missiles plunging directly at him with speeds of the order of 25 miles per second. Kels' mind dizzied at thought of the power required.

Then another thought burst upon him. If such were their defensive strength, what new weapons of offense were about to be turned upon him? The Station in Space could not duck and swerve with the celerity of a cruiser. Its corrective rockets were puny things, fit only to keep the cylinder on its appointed orbit.

But the stranger passed them by with what seemed a derisive gesture. Down, down, it kept on its steady plunge toward the spinning world.

Kels felt an unreasonable mortification. The alien vessel had disregarded him as an unworthy antagonist, too insignificant to waste powder on. The fighter in him stirred to quick, heavy wrath. Forgotten were his almost crystallized suspicions, forgotten even was his bound mutinous comrade, forgotten everything but that last insolent flirt of the stranger's tail.

He set his teeth hard.

"Continuous bursts on the port rocket. Use emergency fuel supplies!"

There was astonishment on the faces of the crew, but one look at their commander was sufficient.

The port rockets started their soft roaring. The Station commenced a slanting, long-distance glide toward the earth.

Kels watched the stranger through the starboard telescope. He was slackening his tremendous drop, preparatory to landing. Then his heart bounded. Rocket cruisers were rising hastily from their cradles to meet the presumptuous invader; tiny black dots coming swiftly from the far horizon were converging on the Great Palace.

● The forces of the Rocket Patrol were being mobilized.

The menace had been discovered! Exultation one moment—his comrades of the Patrol would smash the alien; bitterness the next—he would not be in on the kill. Then the scene turned swiftly from under him.

He issued reckless commands; he drove his crew fiercely. Double charges in the already straining tubes. The forward end of the Station tipped more steeply. He'd land at the Rocket Field on the first revolution about the earth if it meant smashing the Station to twisted fragments. The smell of battle was in his nostrils.

Never did an hour and three-quarters seem so interminably long. Kels glared at the nearing, ceaselessly spinning earth with gnawing impatience. What had happened? Had the vast mobilized armament wiped out the alien without his being present?

The bosom of the Pacific, the steppes of Central Asia, flipped by. The Station was growing uncomfortably hot; they had struck the upper limits of the stratosphere. Europe! It was considerably hotter. The air broke into little globules of perspiration. They were slanting fast. The turbulent Atlantic, not fifty miles below. Steam formed; men staggered in a fog of scalding droplets. The outer shell of the Station glowed from the friction of its swift passage through resistant atmosphere.

The rocket beacon in mid-Atlantic, a vast heaving raft red with luminescence.

Then and then only did Kels return to sanity. They were burning through the air at a mad three miles per second, and only 30 miles up. The port rockets ceased their continuous roaring, the single bow rocket took up the refrain. Flaming gases hurtled past their already superheated sides, exerting slow braking action. The American coastline swam darkly in the distance. Only fifteen miles up now and speed still tremendous at half mile a second!

A petty officer came hurrying over to where Kels stood before the translucent chart on which their position showed as a moving dot.

He saluted. "Lieutenant Davenant wishes to speak to the Captain, sir."

Kels turned. "Eh, what's that?" He had completely forgotten about his comrade. Remorse smote him, dim remembrance of former uneasy suspicions. "Oh, to be sure. Unbind the Lieutenant and bring him in."

Nick Davenant stood unsteadily before him, limbs chafed from restraining manacles, ordinarily fresh-colored face pale. Yet his voice was steady.

"If the Captain is joining battle, I beg leave to participate actively. After, if alive, I shall return to the brig for the Captain's disposition."

Kels covered his own inward confusion with outward cordiality.

"Of course, Nick. Let's forget what happened. You suffered from temporary madness and I was hasty. You're released, old boy, do you understand?"

"The Captain is very good," Davenant said formally in a queer, toneless voice, and withdrew.

Kels stared after him, trying to organize his usual cool reasoning faculties, but the lust of battle still flamed strongly.

Great New York rushed threateningly to meet him; then the Rocket Field. The bow rocket roared with redoubled fervor, the nose of the Station pointed downward at an insane angle.

A confused sight of swarming, diving ships, of the earth tilting alarmingly, a last despairing blast of hot gases, and then a splintering crash.

Kels awoke to find himself wedged into the remains of the calculator. All about him was steam and fog, through which he hazily saw twisted, smoking wreckage. Dim figures staggered crazily upright, groaned and held on to curving walls for support.

Kels tried to extricate himself, but could not budge. Something stabbed sharply in his left shoulder.

"May I be permitted to help the Captain?" some one was asking formally.

Kels stared up through the haze at Davenant's pale, set features.

"Stop the nonsense, Nick," he shouted angrily. "I apologized, didn't I? Here, give me a hand."

Several members of the crew limped through the wreckage, carrying crowbars. It took minutes of careful levering to loosen their commander from the confines of the calculator.

Kels felt his shoulder gingerly. The pain was intense; a fracture probably, but he had no time for such minor considerations. By this time the smoke had cleared. He surveyed the damage swiftly. The Station was a wreck of course, some of the men were hurt, all were bruised and shaken, but no one seriously. The great guns were smashed, but light arms carried by the men seemed intact.

By some miracle, the mechanism of the exit-port had not been harmed. Kels tried it more as a gesture than with any expectation of its working. To his surprise, it did open creakily.

The clean, sweet air of the outdoors rushed in, swept away in great gusts the lingering steamy atmosphere, the rapidly accumulating foulness.

"Men," said Kels sharply, "we're up against a dangerous foe. He is somewhere outside. We know his defensive weapons; we do not know the caliber of his offense. You are men of the Rocket Patrol. That means we attack at once."

CHAPTER IV

Gordon Kyle Speaks

● A cheer rang out. No one held back; eagerness showed on every face. They massed before the exit-port, spray guns in hand, dynol pistols in reserve.

"Let me go out first," Devenant requested quietly.

"*I* am Captain," Kels answered brusquely. "That is my privilege. You follow me."

With that he stepped out, spray gun at the ready, Nick at his heels and the crew in tumbling precision immediately behind.

Kels stopped suddenly short; only instinctive routine caused his men to form ranks like animated automatons.

For the space in front of him was strangely still and lifeless. The alien cylinder, born of the comet, lay quietly on the ground, not a hundred yards away. Its surface was a shimmering network of blue sparkles.

The rocket field, ordinarily a roaring hive of activity, was deserted. Not a man, not a rocket cruiser, on its vast surface. Kels glanced swiftly aloft. The sky was a dense mass of plunging, maneuvering cruisers. Every unit of the Patrol, from the far corners of the earth, had been summoned to the defense.

But, strangely, the great cruisers flashed to within five hundred yards, swerved violently, almost as if twisted by a gigantic invisible hand, and went careening, stern rockets aflame, tangentially off on a new course. *Arnon* pellets, great half-ton dynol projectiles, belched from hundreds of guns, flattened against the invisible sphere of force, rebounded like so many pebbles off into space again. Some of the *arnon* pellets, split by the impact, burnt inextinguishably, so that high in the air, at a radius of five hundred yards, concave curtains of flame obscured the heavens.

The Great Palace loomed with its myriad domes in the distance, softly glowing. Squadrons of men poured out of its portals on the double quick, dragging strange complex machines after them. The pretorian guard of the Dictator, constantly on guard in the Palace, never on duty elsewhere. Great, grim, silent men, sworn to protect His Eternal Majesty with their lives, armed with strange weapons, hitherto undisclosed to the outer world.

And still the space cylinder remained unstirring; no guns peeped out of its smooth surface. Except for the crackling blue flames dancing on the steel, it might have been deserted.

The guard set up their monstrous weapons outside the field of force. Faint barked commands filtered through.

Solid cylinders of white hot radiance projected with unbelievable speed out of the mouths of the monsters, impacted against the invisible protective sphere of force. The hurtling roar of the impact made all other noises sound like the faint pipings of insects. A blast of flame lit up in a visible wall, sizzling and screaming its rage.

For long moments the fascinated watchers saw a battle of giants.

Then, like a thousand Niagaras, the heat cylinders burst through, swept across the intervening air with diminished velocity until they hit the space cylinder. The surface glowed redly. If the energy of the heat paths had not been taken up almost wholly by the resistant sphere of force, the space vessel would have melted into a glowing bubble.

Kels raised his weapon. Nick beat his uplifted arm down again.

"You fool," he yelled above the tumult. "Are you blind; don't you see? The invader is the second Station in Space on which Professor Kyle was lost!"

Kels spoke uncertainly. "There is no doubt about it, but—I figured Kyle and his men must have been long dead."

"How about his descendants?"

In spite of the screaming war around—cruisers diving for the breach in the wall to force their way in; the pretorians preparing another blast—Kels grinned.

"There were no women on board," he pointed out.

"True," Nick acknowledged, temporarily staggered. "But I believe—"

What he believed remained for the moment unknown, for the alien cylinder went into action.

From the end facing the Palace, a bolt crashed out; a long blue zig-zagging streak of lightning. Hundreds of thousands of volts were concentrated in that hurtling sear of electricity. It caught the Dictator's yawning machines on the verge of spewing forth new destruction, wrapped them around with titanic currents.

There was a tremendous explosion, the squat weapons disintegrated into flying molten fragments, the pretorians vanished into unnoticed hurtling blobs of flesh; a rash rocket cruiser, swooping toward the torn-down area of force, was caught in the crashing blue flare, dropped suddenly to earth, a flaming wreck.

Kels blazed into action at the sight of his comrades' death. No matter who these invaders from the comet were, they had committed the unforgivable crime. They had slain men of the Rocket Patrol!

With lightning speed he fired his spray gun. He knew that somehow they had fallen within the sphere of force. The *arnon* pellets spattered against the hull. Instantly the shining steel burst into a score of small burning fires.

Kels grunted satisfaction. No power on earth could quench those terrible fires once they had started. They would eat like voracious wolves through metal and flesh, spreading in wider and wider circles, until the space cylinder was completely devoured.

The only safety of the doomed occupants lay in quick flight into the open. And he and his men were ready. He felt overwhelming curiosity. What strange monstrosities spawned on the far-wandering comet were about to burst on his sight. For his short colloquy with Nick had convinced him of the ridiculousness of his former groping thoughts—even Nick was silent, seemingly at a loss.

● The fires spread, the blue sparkle waned in power.

Soon it would be quenched, the sphere of force would collapse, the myriad Patrolmen, dogs of war burning to avenge their former futility, would attack in overwhelming mass.

The burning cylinder quivered. Kels' crew stood watchfully, weapons ready. A black hole yawned suddenly in the side of the hull. Kels trained his dynol pistol.

A figure stepped out into the confusion of sunlight and thick smoke. Kels' finger tightened, relaxed suddenly.

It was a human being who was standing there, calm and unconcerned as if he were peacefully surveying a wooded glade. He was tall, taller even than Kels, hair and beard of shining white; massive, kindly features clothed in almost god-like majesty. Blake's conception of a beneficent Jehovah come to life out of one of his ancient etchings!

Some one screamed in back of Kels, a dynol bullet went crashing. It missed. Kels whirled. "I'll shoot the next man who does not wait for my command."

The majestic stranger from the comet was unperturbed. His hand was raised in token of peace. Behind him, there filed from the blazing cylinder a round dozen of men, all white-haired and even white-bearded, their countenances stamped with majesty and wisdom.

"Who are you?" Kels shouted, taut with chaotic emotions.

The leader disregarded his question.

"Men of earth, we came in peace, homesick wanderers joyful at the thought of returning to our beloved world. Why were we met with violence and murderous assaults?"

"I knew it; I knew it!" Davenant's voice cracked with excitement. "He's Professor Kyle!"

The old man looked at him curiously.

"Aye, I am Gordon Kyle. Is my name still remembered on earth?"

The floodgates burst for Denny Kels. Unbelievable, yet true. *His* ancestor stood before him, alive after three hundred years! He took quick steps forward, forgetful of raging war, of the massing attack outside.

"I am your descendant, Denny Kels. Your family changed their names after your supposed death."

Gordon Kyle glanced at him sharply.

"Why did they do that?"

"I do not know."

Kyle's eyes were unfathomable pools.

"Know you one Vincent Melius, a contemporary of mine?"

Kels gasped. Of course! *There* was the hidden spring. Both men had achieved seeming immortality.

"Why, Melius is still alive. He is Dictator of the earth. It was his orders that your vessel be destroyed."

No slightest change flitted over the massive features, nor over those of his comrades. They had learnt philosophy in their long, strange exile.

"That had ever been my thought," Kyle said softly.

It was Davenant, fascinated listener though he was, who cried the warning.

"Look out! They're breaking through."

Denny jerked around. The burning hulk was collapsing, and with it the shell of force. The sky was a cloud of rocket ships, diving for them like vultures.

All Kels' training, all his inborn soldierly instincts of loyalty, went completely by the board. His ancestor, cruelly wronged in ancient days, miraculously still alive, was about to be butchered at the orders of the very man who had consummated that ancient wrong.

"Into the Station, all of you," he spoke rapidly to the age-old men. "Its walls will afford some protection."

"Nick, men who have fought and patrolled with me, it is certain death to defy the Dictator. What do you say?"

In one great cry came the response.

"We stick with you. Down with the Dictator."

A quiet smile flitted over Kyle's wisdom-worn countenance.

"Noble souls exist in every age. Your sacrifice, however, is unnecessary. We are not unprepared. Nevins!"

A grave, slightly stooped senior stepped forward, deposited an oblong black box he had been carrying. It was smooth and shiny, only one knob disturbed its surface. He twisted the knob once. The diving rockets were not over a thousand yards above; bursts of flame at the mouths of protruding guns proclaimed missiles of destruction already on their way.

The box clothed itself in scintillating blue sparkles. Kels felt waves flow past him. Smashing projectiles rebounded suddenly, careening cruisers were torn out of their downward plunge.

Kyle nodded in satisfaction. "We are safe now. The sphere of force is in operation."

"But how—?"

● "Simple enough." A sad smile flitted over his face. "We had plenty of time on the comet to perfect and invent. All our people were great scientists even in what we now call their youth. We found a way of concentrating the magnetic waves that flow constantly from the sun and reemitting them. Nothing can penetrate their field."

"Those new flame cylinders which I never knew existed, seem to have broken through," Kels pointed out.

"That is true," Kyle admitted. "But that was because we did not use sufficient power. But now—" his voice grew stern and rigid, "I have something to say to Vincent Melius, the false friend of my youth. Where is he hiding?"

Davenant pointed. "Over in the Great Palace."

Kyle took out of his metallic-threaded tunic a tiny instrument, for all the world like a small edition of a loud speaker, placed it to his lips. He faced the Great Palace, seemingly oblivious of the army of soldiers massed before it, shooting at the charmed sphere with every weapon that earth's ingenuity had contrived; oblivious too of the daring Patrol ships, hurling themselves again and again in a vain attempt to break through.

"Vincent Melius, Vincent Melius," the words trickled faintly to Kels, but he surmised that they resounded in the Great Palace, resounded in their intended auditor's ears. "Take heed. Gordon Kyle has returned to earth to hold you to account for your treachery."

Silence, or what seemed like silence to the straining men, in spite of the bedlam outside the sphere.

Then a voice dropped in their midst, cold, sneering, yet with something of repressed fear about it.

"So you have come back, my friend. What a pity you did not crash to destruction as I anticipated. Immortal too! And generous as always, you shared the secret with those others. But it had been better for you to have remained on your comet—for now I shall destroy you—forever this time, and rid myself of the haunting doubts of centuries."

"You haven't succeeded thus far," Kyle mocked.

"No, but reserves of the flame cylinders are being brought up."

Kels and Davenant looked at each other. They had witnessed their power once. But Kyle did not seem alarmed.

"I give you this last chance. Disperse your forces, come here alone to meet me."

Melius' laugh grated harshly. "The mouse offering the cat terms!"

"On your own head be it."

Kyle removed his voice-diffuser, nodded to another of the elders. That worthy produced a short tube, swelling at one end into a globe of shining metal.

Kyle contacted the globe with the oblong black box, pointed the free end of the tube at the distant Palace. Then he twisted the tube once.

A long blue stream leaped out of the nozzle, widened into a zigzag bolt of lightning. It roared across the intervening distance, seared its way through the massed soldiery in its path, contacted the nearer corner of the Palace. The metal melted in a shower of blazing sparks. Kyle moved the nozzle slightly. Another section of the doomed building disintegrated. With wild cries of terror, the soldiers abandoned their weapons, fled for their lives in streaming disorder.

Remorselessly Kyle moved the nozzle again. Half the Palace was a blazing pyre.

The voice of Melius dropped in their midst, still cold, still passionless.

"Enough, Gordon Kyle. You have conquered. My army is scattered. I shall come to you as you wish."

"Let it be without treachery," the professor warned him through the voice-diffuser.

"I am at the end of my resources." Melius sounded a little weary.

The little group waited in silence, each man busy with his own thoughts. The great army had melted away, leaving guns and dead men behind; the Patrol, obedient to an unheard signal, reluctantly withdrew. Kels could envisage the gritty vows of vengeance among his comrades.

Out of the wreckage of the Palace a figure emerged, walked steadily, even springily across the shambles of the battlefield with never a glance to the right or to the left.

Davenant leaned over and whispered admiringly in Kels' ear. "The Old One is defeated, but he has spunk."

As Melius approached the invisible confines of the sphere of force, Kyle shut off his instrument, turned it on again as soon as the erstwhile Dictator had entered.

Melius came to them with calm, unblemished countenance, his smooth features contrasting with the time-mellowed faces of his ancient contemporaries.

He stopped directly in front of Kyle, his head high, eyes a trifle tired, though.

For a minute these ancient friends, now enemies through the treachery of one, gazed at each other, glances clashing.

The scientists of the old Station, innocent victims of the design of Melius, watched immovably. As for the earth-men of the day, Kels, Davenant, their crew, mere babes in comparison to these elders, the drama of it all held them tense, fascinated.

Kyle was the first to break the silence. There was sorrow rather than anger in his voice.

"You, Vincent Melius, the friend of my youth! The man I trusted with the secret I had discovered, with whom I was willing to share immortality itself, a traitor! You tampered purposely with the rockets of the Station in Space; you schemed to destroy me. Why? What harm had I done you? What had I done except load you with benefits?"

"Harm!" Melius flung back with a trace of passion. "No harm except the greatest harm of all. You committed the unforgivable error of imparting your secret. The consequences were inexorable. I grasped at once the full meaning of the immortality you foolishly bestowed on me. Inevitably it must lead to power, vast power, over an earth of ephemerids. I envisioned the two of us finally clashing over the Dictatorship. There would not be room for both. I simply forestalled fate, removed an obstacle that might prove too much for me later on."

● Kyle surveyed him pityingly.

"It never occurred to you that immortality might prove a burdensome thing; that no power, but accumulation of wisdom and benefiting one's fellow men was its only justification. I've discovered that in the long, bitter years on the comet. Fortunately or unfortunately, the tiny planetoid that is its nucleus possessed the elements of a breathable atmosphere, some plant and animal forms for the maintenance of life. Our existence, mostly in great caverns, was a constant battle with inimical forces. All our ingenuity was called into play. But bitterest of all was twice to be hurled around the sun, too far away for any possibility of a successful take-off to earth. The Station had not smashed, owing to the slight gravity. The third time we took the chance."

Kels interposed daringly.

"What is the basis of immortality, Professor?"

Kyle turned calm, amused eyes on him.

"Young descendant of mine, seek not after false gods. Immortality is a snare. Now that my mission is accomplished, I shall renounce it gladly; so shall all my friends."

The venerable ancients nodded acquiescence.

"But," Kyle continued, "I shall explain the scientific principle to you, knowing full well you could not duplicate the process. Life is a matter of metabolism. Each cell in your body is constantly destroyed (the process is called katabolism) and as constantly renewed (the name of that process is anabolism).

"But," he warmed up to his subject, "as man grows older, katabolism inevitably increases over the regenerative process. The cells grow tired, lose their ability to rebuild what has been destroyed. That is old age, and finally death.

"Now if each cell could be activated, its vigor refreshed, the balance could once more be restored. In one-celled animals like the amoeba that is done by cell division, which somehow acts as the vitalizing influence.

"I accomplished the same effect with cosmic rays, heavily concentrated. These extremely short, powerful rays impacting on the cells, stir them up, make them vigorous. Constant baths in their influence is the secret."

Kels remembered the strange radiance beating down on Melius during their interview in the Palace.

"I was not satisfied," Kyle pursued his topic. "My calculations proved the method I employed would keep the balance not much over three hundred years," Melius started violently, "and accordingly I went up into the Station in Space for a closer study of the rays. I had discovered the final secret of indefinite immortality, when the catastrophe came."

Melius had lost his calm. The youthful skin was suddenly old and waxy.

"You mean," he cried, "I am nearing dissolution; that you—you have achieved true immortality?"

"That is true," Kyle admitted.

"The secret, the secret," Melius choked.

"It is not for you, or any one else," the professor told him with a touch of disdain.

Melius threw his arms out wildly. "I felt it—I knew it all these years. That was the canker at the base of my existence. The torture of not knowing when I would suddenly collapse in death. Give me the secret," he implored. "I want life—eternal life! I do not want to die!"

His hot panting eyes searched from Kyle to the others. Kels felt quick pity; the Dictator, the awful Eternal Monarch, transformed into this groveling wretch.

"I shall give you all," Melius said cunningly. "Power, the Dictatorship of the earth, shall be yours. For myself, only true immortality. I shall even take a rocket cruiser, go out into space, try for the comet, for Mars, anywhere; you need not fear."

Kyle shook his head gently.

"I do not fear you; I pity you. But my eyes have been opened. Immortality is a curse, not a blessing. I am destroying the secret, even if it destroys ourselves."

Melius' next movement was so sudden that it caught Kels off guard. In the absorbing drama of the moment every weapon had been lowered. Melius plucked a squat

(Concluded on Page 731)

Full into the glare of the radium ray he rocketed, his senses leaving him in a sudden wave of heat. Like a meteor he catapulted straight for Mars thousands of miles distant.

ESCAPE FROM PHOBOS

BY NEIL R. JONES

● The greatest evidence of the great antiquity of Mars is found in the peculiar position of its two moons, Deimos and Phobos. Both are close to Roche's Limit, that is they are so close to the mother planet that they are doomed some day to be broken into fragments by the superior pull of Mars.

It is even possible that the two moons are the remains of a larger moon that once circled Mars, perhaps as far away as our moon is from us; and approaching closer and closer through long ages finally came so close that it was split into at least the present two pieces.

However that may be, the result is that Phobos is so close to Mars and its gravitational pull, as compared with Mars is so slight, that a good push would send one shooting off Phobos into the gravitational attraction of the mother planet. That this situation could lead to "wonderful" adventures, Mr. Jones shows in this fast-moving story.

● Ern Hantel stared out into space from his cell. Surrounding him were the grim, gray walls of the interplanetary penal colony of Phobos. A scourge of the Venusian colonies, he was condemned to die.

His latest act, for which he had been captured by members of the Hayko Unit, had been the wrecking and pillaging of a space ship on the swamps of the clouded world.

Visible through the transparent square in the ceiling of his cell, the vast, rotating sphere of Mars grew gradually gibbous, quarter full, then crescent as rapid moving Phobos hurtled around the red planet. But Hantel's mind was not concerned over details of cosmic beauty. He had come to hate the sight for what it portended. Tonight his mind was in a turmoil of hope and conflicting emotions.

Several hours earlier, during the recreation period, the convict who occupied the cell next to Hantel's had furtively slipped him a metal object the size of his fist, muttering of escape and warning him to listen for a scratching sound beyond his cell. Not until he was once more in the privacy of his cell did Hantel examine the contraption. It was a communicator, like those used by miners in the Martian diamond mines. Sudden fear of the television guard had caused Hantel to conceal the instrument beneath his bunk and assume his present position.

He cursed beneath his breath. None of the prisoners ever knew when the prying television guard was going his rounds from cell to cell, watching and listening. Hantel continued staring into the cosmic depths, his ears strained to catch the telltale signal which his cell neighbor, Lars Hoenbraun, had promised to give.

Hantel's nerves were a bit jumpy, and his muscles contracted swiftly as a subdued, grating noise came from the direction of Hoenbraun's cell. His heart pounded like mad, as with shaking hands he removed the communicator from its place of concealment. What if he was being watched?

Once more a dull grating sound issued from the wall. Locating it, Hantel pressed the wireless telephone against the wall, placing his ear at a small opening in the communicator. Low spoken words reached him distinctly.

"Hantel—are you there?"

"Yes!"

The word was hissed in an excess of excitement and pent emotion.

"Do you want to escape with me?"

"Escape—do I—how?"

"Are you willing to brave death?"

"Death!" Hantel spat the words sarcastically. "I am condemned to die—I have nothing to lose!"

"Just as I thought," mumbled Hoenbraun. "You certainly won't turn yellow, and I need your help."

"The television guard will see us!"

Hantel's voice trembled in anxiety. But the other's easy laugh partially assured him, while his words put Hantel completely at ease.

"We're safe for ten minutes at least. The television guard goes the rounds every fifteen minutes. I've got a detector here."

As Hoenbraun spoke, he turned and glanced at a small pinhead set into the composition of his bunk. In contrast to the alarmed features of the man in the next cell, Hoenbraun's saturnine face reflected easy assurance. The broad forehead and intelligent eyes were not those of the hardened criminal. Hoenbraun was a lifer, having already served two years. Few people knew why he was serving the term. Hoenbraun's searching eyes saw that the head of the imbedded pin was dark. When the television unit was being used, the head of the pin, comprised of radioactive substance, glowed. The master criminal had gone to a great deal of risk to obtain the detector.

"Do as I tell you, and together we stand a good chance of escaping to Mars."

To Mars. Hantel's sudden hopes which had momentarily burst into flames suffered a relapse. What crazy idea did this madman entertain? Escape from the prison was doubtful, but escape from Phobos—

"If we get free of the prison, how can we reach Mars? We can't steal a space ship. There's not a one on Phobos. Those damned—"

"We won't need a space ship," was Hoenbraun's disquieting reply.

Hantel was now positive that Hoenbraun had gone mad from his long confinement on the Martian moon. But Hantel was desperate, and death stared him in the face. He would grasp at any straw. He argued with Hoenbraun, wondering what his mad scheme could be.

"Even if we reached Mars, the telescopes here would follow us until we were hunted down. We have no friends there."

"I have friends there."

These words aroused the hope of the condemned prisoner once more.

"How can they help us escape from Phobos?"

"They can't," was the enigmatic reply. "They can only help us after we have reached Mars."

"But how are we to reach Mars?" queried Hantel, coming to the crux of the situation.

● Hoenbraun evaded the issue with a countering query.

"First, will you promise never to reveal the identity of those on Mars who are waiting to help us?"

"I promise."

"Good. Did you ever hear of the Claren affair?"

"Yes—if you mean James Claren."

"The same one. His death was a mystery. The Hayko Unit were just in time to prevent his body from falling into the hands of the Asurians."

Hantel was nonplussed. What was Hoenbraun driving at with this mysterious talk? Hoenbraun's next remark threw more light on the subject.

"I am the man they arrested."

"The mystery man in the space ship?"

"Yes—according to the Television Intelligence of the three worlds," Hoenbraun calmly admitted. "They could never prove that I had a hand in Claren's death. In fact, had they only known it, Claren was not murdered but died a natural death. They proved nothing against me. That's why my sentence is not a death sentence—like yours."

A light broke in upon Hantel's mind. Who among the three worlds had not heard of the Asurian organization, those grim, scientific Utopians who were ready to stop at nothing in their experiments for world betterment. Banished from the earth because of practices in condemned sciences, the Asurians had fled to a secluded portion of Mars far from civilized habitation. Here, the members of the organization practiced their experiments unmolested. They were reputed to be immune to the less violent causes of death. Their search for longer life had already yielded them that.

It was told that they had become lacking in many human instincts through their cold, calculating attitude towards life in general. Born in the biological laboratories, their infants never knew childhood. In the aging chambers, they became full grown adults in a short space of time.

All this Ern Hantel had heard rumored, and more. The Asurians were adepts at brain operations. Mental power was one of their chief interests. Brain faculties were studied and experimented with from all angles. Hypnotism and mind reading were among their many accomplishments.

Hantel considered. Hoenbraun had as much as admitted to him that he was affiliated with this cult whose activities on the earth had caused them to be persecuted and driven off the face of the planet to Mars, a grand exodus in space ships. They were evidently watching and waiting for Hoenbraun's escape. The latter seemed to follow Hantel's trend of thought as was evidenced by his next words.

"They will shield us—hide us in their caves when we reach there," he promised.

"But how can—"

"The television guard!" was Hoenbraun's snapped warning.

It was quite unnecessary to instruct Hantel in his next actions. Like a flash he secreted the communicator beneath his bunk and assumed his usual position—that of gazing into the starlit heavens.

On the other side of the wall, Hoenbraun's actions were similar but more rapid and efficient. The convict was practiced at sudden concealment. From the corners of his eyes he watched the glowing pinhead, knowing full well that he was being watched for the customary length of time given each block of cells by the television guard. The invisible eyes saw nothing alarming either in Hoenbraun's cell or that of Hantel. The latter reclined on his bunk, looking up through the ceiling. Hoenbraun sat on the floor with his back to the wall.

His eyes were fixed upon something which escaped the keen glance of the guard. The years in the penal settlement of Phobos had not been idle ones. Beneath the center stone of the cell floor was a small cave, a hideaway for a secret horde of useful articles which Hoenbraun had seen fit to steal from the prison stores at various opportunities. The stone flag fitted snugly over the hole. A small rock disintegrator had solved the problem.

Hantel once more heard the scratching signal on the wall, telling him the television guard had gone. He eagerly resumed communication with Hoenbraun once more. Into his ears was poured the most complete and daring plot to escape that was ever concocted. Only one man had ever succeeded in escaping from the isolated moon. He had stolen a space ship belonging to the guards. As a result space ships were no longer quartered there.

Hantel's incredulity turned to amazement at the genius and sheer audacity of his fellow conspirator. Hoenbraun planned to tunnel under the prison to the supply house, using the rock disintegrator. At the supply house were space suits, and the stored rocket cylinders used in the base of space ships. In a matter-of-fact voice, Hoenbraun detailed his plans to use these in rocketing them across space to Mars. Hantel listened, breathless and open-mouthed.

"Are you still game?" queried Hoenbraun.

"I'll try it!"

● Yet Hantel's heart beat like a triphammer at the very thoughts of his body hurtling towards the huge world like a human rocket.

"You'll need the sheets of your bunk for a parachute," Hoenbraun informed him. "We'll fix them when we reach the supply house."

"Can we get electric pistols at the supply house?"

Hantel's fingers itched for the feel of a weapon. He knew he would feel better.

"We won't need weapons."

"Why have you waited so long—so many months?" asked Hantel. "Why didn't you go it alone?"

"I've got to have help when the supply room is reached. It's no one man's job fastening on those rocket cylinders over the space suits. Two of us can work faster than one. By the map I have here, the supply house is quite a ways away. It will take time digging there."

"When do we start?"

"I'll commence the digging soon after the next meal hour. Those on Mars know of my plans and they expect me to make my break. They are watching Phobos with their telescopes nearly every night."

"But the television guard!" expostulated Hantel. "He'll miss you from your cell!"

"I've prepared for that," was Hoenbraun's quiet reply. "I made a dummy which looks pretty much like me. It's down in the cave."

Together, the two convicts made their final plans, Hoenbraun acquainting his fellow conspirator with the details of their escape. He seemed to evade mention of his Martian friends however, and always turned the subject rather skillfully when Hantel mentioned the Asurians. He did show Hantel where they must steer their course, pointing out a tiny red spot near the Martian equator, a bit south of the Silmono Desert. Through the ceilings of their cells, both convicts could plainly see the red world.

The meal hour arrived. A guard came and shoved Hantel's food beneath the strong metal door. The convict finished eating and sat on his bunk, his nerves on edge. What if they were caught? It would mean death for Hoenbraun and a quicker death for himself. Rocketing themselves across space! It was foolhardy. Even Hoenbraun had admitted they were taking wild chances—yet, it was the only way of escaping from an otherwise unescapable penal colony. And a fight for life was preferable to certain death, no matter how slow the latter was in being meted out.

As Hoenbraun had instructed him, Hantel tapped on the floor beneath his bunk several times every few minutes. When the television guard next looked into Hantel's cell ten minutes later, he saw the space ship scuttler sitting on his bunk looking out into space. In the next cell, Hoenbraun was apparently sleeping. Neither of the convicts were given particular attention. The guard passed on to another television plate, continuing his inspection.

Hantel knew that Hoenbraun was not in his cell. Had the latter been in his cell, there would be no need for Hantel's tapping of the floor. He was not at all surprised when a voice spoke suddenly from beneath his bunk.

"Hantel—here I am!"

Ern Hantel slipped from his bunk and stared at Hoenbraun's grimy face peering up from a hole beneath his bunk. An arm was thrust upward. Hantel gripped the outstretched hand.

"I had trouble locating your foot taps," said Hoenbraun. "If I'd dug through anywhere except beneath your bunk, that hawkeye would—"

"Is it time for inspection?"

Hantel straightened up in apprehension at the thought of being watched.

"Not for seven minutes or more," replied Hoenbraun. "If this rock disintegrator holds out, we'll be free of the prison before another Martian day passes."

"Are you sure the supply house is unguarded?"

"Positive. When I reach there, I'll be back and let you know. I've got to change the dummy now. If it lies quiet too long, the hawkeye may get suspicious."

"Good luck!"

CHAPTER II

Escape!

● Hoenbraun's head disappeared. Hantel lay down on his bunk. This was the sleeping period but Hantel did not sleep. Long, nervous hours passed in which he knew Hoenbraun to be busy digging the tunnel to the supply house. A subtle sixth sense made Hantel conscious of the television guard's scrutiny from time to time. The convict chafed at not being able to get down in the tunnel and help his confederate. The inactivity worked on his nerves. Yet absence from his cell was too risky.

Finally Hoenbraun returned. Hantel was first aware of his presence by a low hiss beneath his bunk. The tunnel was nearly finished. One corner of the supply house on the outskirts of the prison settlement had been reached. A little more digging was still necessary.

"Got to change that dummy again," muttered Hoenbraun in subdued tones. "It won't do to let the hawkeye see me lying still too long. He knows me better than that."

Hantel waited with wildly beating heart while Hoenbraun scampered down the long tunnel which the rays of the stolen rock disintegrator had bored. Almost immediately, Hoenbraun returned.

"Have you reached the supply house?"

"Yes! But I can't get in there! I need your help, Hantel! Fix your bed so it will look like you're sleeping—and don't forget to bring your sheets!"

"I may be watched!" protested Hantel.

"Not a chance! The television guard went his rounds five minutes ago! I've got the detector down here with me!"

Quickly, Hantel bunched his bedding after first removing the bed sheets. In the meantime, Hoenbraun returned to his own cell for the improvised parachute and other articles he wished to take with him. Hantel met him in the tunnel beneath his cell. Together, the two felons made their way to the end of the tunnel. With the aid of Hoenbraun's dim light, another of his light-fingered acquisitions, they saw above their heads the floor of the supply house.

Metal framework glistened. This the rock disintegrator had left untouched. Hoenbraun picked up the rock bore and climbed to Hantel's shoulders. In a wide swath he cut away the rock beneath the flooring, searching for an interstice between the metal supports. Hantel's back commenced to ache, yet he held on grimly.

"Ah!" The exclamation announced success.

Pushing aside the litter of debris left by Hoenbraun's hasty direction of the rock disintegrator rays, the convict stepped up on Hantel's shoulders and wiggled his way into the supply room. He then reached down to receive his parachute and the materials for Hantel's. After that, a helping hand pulled the space ship scuttler himself into the supply house.

"Are you sure there are no televisors here?"

"None at all," replied Hoenbraun.

The supply house was dimly lit by luminous coated walls. It represented one large chamber. At one end were piled long stacks of metal cylinders. Hoenbraun, his eyes glistening in anticipation, pulled several of these down upon the floor. Hantel turned his attention to sev-

eral space suits which were hung on pegs in the wall.

Hastily they climbed into the space suits. Hoenbraun admonished his companion against closing down the helmet until they were ready to leave. The two convicts turned their attention to the rocket cylinders. Hantel allowed his fellow conspirator to strap one of the cylinders tightly to his back and hang another one rather loosely under his right armpit. The second cylinder was to be used only for maneuverability in space, to keep them steered to the right course. Hantel then did the same for Hoenbraun.

"What about the parachutes?"

"They come next," was Hoenbraun's reply. "It won't take but a minute for me to fix your sheets." Hoenbraun handed him the parachute he had kept hidden beneath his cell. "Slip this on while I'm fixing the other one. Just step inside the big loop and fasten it around your space suit."

Hantel did as he was directed. The loop caught on the side of one of the rocket cylinders.

"Be careful of those little catches on the cylinders!" Hoenbraun warned. "We won't be pulling them until we hop off Phobos. They regulate the release of energy."

Hantel fastened the parachute firmly to his back while Hoenbraun turned his attention to the sheets Hantel had brought from his cell. In the dim light of the supply house, he spread them upon the floor and prepared to cut them with a small knife. He fingered the fabric idly for a moment, a puzzled look crossing his face. In apprehension he ran his hand over it.

The convict's face paled slightly. He turned a startled countenance to Hantel.

"Hantel! This isn't delamurin!"

"What do you mean? What difference does it make?"

● Fear gripped the heart of the ship scuttler for a moment.

"Difference?—I thought—I thought all the sheets in the prison were made of delamurin!" Hoenbraun paused for breath and contemplation as he clutched the sheeting which Hantel had brought from his cell. "This stuff of yours won't bring you down safely on Mars! It's not strong enough to stand the strain."

"You mean it's no good at all?"

"Worthless!"

For a moment, silence gripped both men. Desperation struck at the heart of Ern Hantel. To be so near the final step for escape—then have this happen! Hoenbraun wore a puzzled frown, his brain working swiftly. The delamurin was something he had taken for granted. The cloth was like heavy silk, made from a plant which grew on Venus.

"What shall we do?"

Hantel's question rang hollow.

"It is a question of what you will do," countered Hoenbraun determinedly. "Give me my parachute."

Hantel made no move to turn over the coveted parachute. Instead, he stalled Hoenbraun with argument.

"What am I to do?"

"Only one of us may land with a parachute. You must chance a safe landing with the use of the rockets. I'll fasten a third rocket under your other arm."

Hantel's eyes gleamed dangerously with the old fire which honest men had come to hate and fear before prison discipline had broken his confidence. His jaw tightened perceptibly.

"You're so damned smart!" he spat. "You know how to do it! Try it yourself!"

"Give me my parachute!" snapped Hoenbraun, taking a step toward the space ship scuttler.

"I'll see you in hell first!" cried Hantel, smashing his fist into Hoenbraun's face.

The latter landed solidly against the stack of rocket cylinders, bringing several of them down with a loud racket. He staggered up, his hand flying to a recess within his space suit. Out flashed an electric pistol.

"You dirty liar!" raged Hantel. "You told me you had no weapons!"

"Just an ace I was holding in case something like this happened! I don't need you any more! You're going to die!"

Hoenbraun raised the pistol. A blue flash streaked silently from the gun.

* * *

When the television guard on his next round looked into Hoenbraun's cell, the body of Hoenbraun lay sprawled in an unnatural position on the floor beside his bunk. The guard's eyes went wide. He called into the mouthpiece.

"Hoenbraun!"

The figure lay still, face downward. There was no response. Again the convict's name rang imperatively through the cell while unseen eyes waited for him to rise. The television guard gained communication with the attendant of that cell block.

"Something is wrong with Hoenbraun. Go to his cell."

The guard watched through the televisor as the attendant entered, electric pistol held ready for treachery. Such ruses as playing sick had been employed before. The attendant walked up to the inert figure and nudged it gently with his toe. He turned the convict over. The man's face was bashed inward. The guard's jaw fell in amazement. He seized the head which crumbled to pieces in his hands.

"A dummy!"

"Look beneath the bunk!" the television guard instructed.

The attendant did so. "He's not here! He's escaped!"

A general alarm was issued throughout the cell block. Leaving the televisor in charge of an assistant, the guard sprang down the corridor and hurried towards the cell block. Here, more guards were gathered excitedly, weapons ready for instant use.

"He can't get out of the cell block! He's hiding in this building somewhere!"

"Search all the cells!"

The guards sprang in various directions to execute the hurried search. Two of them searched the cells adjacent to those of Hantel and Hoenbraun. Men grumbled and inquired as they saw their bunks inspected and peered under. Finally they opened the door to Hantel's cell.

"Nobody in here but him!"

"Hantel—wake up, you!"

There was no response. The guard strode forward and grasped the form beneath the quilts. It yielded in his grasp. In amazement, he ripped the bedding from the bunk. Hantel was gone.

"Two of them gone!" was the bewildered exclamation of the guard. "Wait until the warden hears this!"

His companion was peering in under the bunk. He saw a round, dark cavity.

● Hantel made a vicious lunge for Hoenbraun's legs a split second before the latter fired. The blue spurt of electrocution shot perilously past Hantel's shoulder, while Hoenbraun went down beneath the other's attack. The two convicts grappled desperately and awkwardly in the encumbering space suits. The rocket cylinders also hindered speedy action. Hoenbraun fought insanely to bring the pistol butt down on Hantel's head. At such close quarters it was suicide to fire. The ship scuttler took the frantic blows on his forearm protected by the space suit covering.

Ern Hantel waited his opportunity. When Hoenbraun rolled free in an attempt to use the business end of the gun, Hantel seized his loosely hung rocket cylinder and brought it down upon Hoenbraun's head. The pistol dropped from nerveless fingers. Hantel became aware of a faint sputtering. An acrid smell filled the air of the supply house. An iridescent spurt of flame issued from one of the rocket cylinders Hoenbraun had knocked down from the stack. With a loud report, it plunged into the stack of cylinders which towered over Hantel's head.

The space ship wrecker leaped aside just in time to be free of the thundering fall of the cylinders. They buried Hoenbraun in their avalanche, crushing him to a pulp. The sputtering increased. One of the rockets shot ceilingward. Hantel, terror gripping him at the sudden death unloosed all about him, clamped down his space helmet. He still held the pistol which he had picked up when Hoenbraun fell. Stuffing this hastily in the outer pocket of the space suit, he hurried into the air lock leading from the supply house.

Several more of the rockets burst through the roof of the supply house and went careening off Phobos and into space. A new feeling, one of confidence and exhilaration, possessed Ern Hantel as he saw the stars above his head once more with no confining walls around him. He ran as swiftly from the prison settlement as the space suit and rocket cylinders would allow him.

Quite suddenly he shot skyward for several hundred feet. His heart jumped into his mouth, but he came down to Phobos once more with a nervous laugh, realizing that he had run free of the gravitation attraction of the Martian moon. In a hollow of the rough ground, Hantel took stock of the situation. In the star sprinkled heavens above him, the gigantic sphere of Mars rolled imperceptibly slow. It beckoned, yet he knew flight through space was fraught with many dangers. But it offered a gamble for life, while on Phobos he could expect nothing more merciful than death.

The ground beneath his feet trembled. Climbing to the edge of the pit, he stared back at the supply house on the outer edge of the prison settlement. One half of it lay in wreckage. Fragments were falling back on Phobos. Terrific explosions were reducing the supply house and threatening the entire prison.

Hantel saw figures running about the prison yards in space suits. The baleful stare of the radium ray swept the vicinity of the prison settlement from its position in the prison tower. The dread weapon wavered searchingly as powerful illuminators threw the surrounding landscape into a mottle of dazzling projections and sharp etched shadows.

There was no more time to be lost. The radium ray was flicking rapidly in the direction of the hollow where he crouched. Planting his feet squarely on the ground, he fumbled for the rocket release on the cylinder strapped to his back. There came a sputtering of released energy. Hantel felt suddenly lighter. The ground shot away from his feet so rapidly that it seemed his vitals were surging out of him.

Full into the glare of the radium ray he skyrocketed, his senses leaving him in a wave of sudden heat and overwhelming nausea. The convict flicked out of sight of the naked eye, leaving a thin train of iridescence behind him. Like a meteor, his body catapulted straight for Mars which swung lazily in space thousands of miles distant.

Hantel was not dead. Recovering from the shock of his rapid ascent off Phobos, he became aware of a dizziness. His whole body ached and his sight was blurred. Mars was an imperfect blot on the sky, surrounded by a hazy mist which was starlight. Phobos represented a round disc in the background. A subconscious urging in the back of his mind prompted him to reach behind him with leaden arm and turn off his rocket release. The momentum he had gained already approached fantastic figures.

When his sight cleared, he found himself rushing at the great sphere of Mars. He felt better now that he was far beyond the dragging attraction of Phobos and fully in harmony with Mars' greater pull. He raised an arm. The fabric of the space suit was seared on one side, while the metal parts were slightly corroded. Only the great speed of his take-off from Phobos had saved him from the destructive radium ray.

● Mars loomed slightly nearer. Hantel was fascinated with the experience, yet fearful of its outcome. He had no way of judging his speed. The proximity of Mars was disillusioning. He turned and looked back at the diminishing disc of Phobos. He was sure he had left plenty of cause for excitement behind him.

There would be no immediate pursuit for the penal colony possessed no space ships. What Hantel had to fear was what would happen after landing on Mars, if he contrived to do so alive. Radio reports were flying thick and fast, he knew well enough.

He searched for the red spot near Mars' equatorial line which would mark the Silmono desert. He must try and land on the southern edge. He thought of the Asurians and his heart chilled a bit. Hoenbraun had told him where to find the condemned cult. He must explain Hoenbraun's failure to come. That would be easy. He turned his entire attention to the more difficult phase of his escape, a safe landing at the right spot.

The red desert was not in sight, but presently, much to Hantel's relief, it rotated slowly into view out of the darkness of the Martian night. The convict brought his second rocket cylinder into action. He had occasionally maneuvered space ships, and the practice now stood him in good stead. He checked his mad pace and headed for the Silmono desert far below him.

Hantel's heart pounded and he nearly froze in nervous fascination as he checked his speed to that of a swiftly falling body several hundred miles above the Martian atmosphere. Snap judgment would not do here. He must calculate accurately or die. As the outer rarified atmosphere rushed up at him, he released a second blast from the rocket cylinder which slowed him down nearly to neu-

tral after which he dropped like a plummet towards the vast red blur with its border of green. A wailing of wind whistled past his space suit.

With a jerk, the ship scuttler released the retaining strap of his parachute folds. The rushing current of air opened them with a snap which nearly jerked him out of the body gear. The convict held on like the grip of doom, but it was the metal protuberances of his space suit which saved him from losing the parachute.

Stars quickly disappeared and the sunlight mellowed into gold. The surface of Mars rushed up to meet him. He struck the ground with a force which threatened to snap his legs. For a moment he rolled in pain beneath the folds of his parachute. His chest ached where one of the rocket cylinders had jammed a hole through his space suit.

He arose and looked about him, pushing off the entangling parachute. Phobos was now a pale crescent, nearly out of sight below the horizon. Hantel knew that telescopes had watched his landing. Somewhere in that darkened portion of the moon lay the hated penal colony. All about him lay a desolation of red rock and sand. He divested himself of the encumbering space suit and the cylinders. Retaining the electric pistol which he had taken from Hoenbraun, the escaped convict trudged across the desert.

Purple hills beckoned from the horizon. He had fallen just inside the southern rim of the Silmono. Escape and concealment were in sight. This part of Mars represented extreme loneliness. The colonies from the earth were thousands of miles away. Hantel could fully understand why the Asurians had chosen this secluded spot.

Reaching the hills and glad to be out of the sweltering, desert sun, Ern Hantel immediately sought concealment and rest. He had reached the hills none too soon. Several Martian ships from the colonies flew low over the desert. Hantel shook a vindictive fist at them, cursing beneath his breath. They were hunting for him. All that day they cruised back and forth.

Night fell. Deimos shone alone in the sky. The faster speed of Phobos had taken the little moon around upon the other side of the planet. By the faint illumination of Deimos, the escaped convict picked his way in the direction of the valley which Hoenbraun had told him harbored the Asurian cult. Phobos soon rose again above the horizon to add its brilliance to the light from Deimos. But the fugitive was not thankful for this added light. To him, Phobos represented a great, malignant ogre from which he had barely escaped.

More space ships joined the manhunt. Brilliant searchlights flared over the vicinity of the red desert and adjoining foothills. Like a hunted animal, Ern Hantel skulked and hid. When morning broke, the fugitive watched the space ships circling the horizon. Fingering the butt of his electric pistol, he cursed them roundly. From time to time, one of the ships cruised nearer, keen eyes surveying the dense verdure beneath. It was a wild, uninhabited portion of Mars. Wild life scattered from Hantel's path in fright.

CHAPTER III

An Old Man Returns

● He came to the rim of a deep valley. This was the valley Hoenbraun had told him about. But Hantel saw no habitations. The valley was bare. On the other side, gray cliffs reared their ugly faces, rising sheer and towering high above the valley. Hantel saw no sign of the cult. Was this the valley, or had Hoenbraun deceived him? He was surrounded by a vista of loneliness.

Before venturing from his concealment, Hantel stared into the sky. He saw none of the space ships. Phobos was not in sight, having disappeared below the horizon some time ago. The escaped convict walked along the valley's rim, keeping a sharp eye open for space ships.

A disturbing thought suddenly explained to him the absence of the ships. They were playing with him like a cat with a mouse, waiting for him to show himself. Out of sight beyond the atmosphere, he felt telescopic eyes fastened on his every move. Too late he realized his mistake as the dread suspicion struck him. Scuttling into the valley, he slid and ran down the steep declivity. At the foot of the rugged descent, he searched for a hiding place.

He found a mossy ledge and slunk beneath it. At least, he would not be seen from above. Panting and exhausted, he stared wildly at the electric pistol he clutched firmly. They would pay dearly before they took him back to Phobos. No, he would not go back alive.

Out of the tail of his eye, Hantel caught a sudden, indistinct movement against the gray cliff opposite him across the valley. Then he saw it, a gray figure moving along the base of the gray cliffs. It was a man dressed in the same color as the rock. The figure beckoned to him.

Hantel, desperate, wild-eyed and weary, stumbled across the valley floor towards the gray, somber cliffs where the Asurian waited for him. Halfway across the valley, Hantel glanced upward apprehensively. Several small dots far up in the sky were growing larger. The pursuing space ships! They meant imprisonment—death! The oncoming craft were lost to sight as he plunged beneath overhanging vines and foliage near the foot of the cliff. The Asurian did not wait for him but ran on ahead to where an opening in the gray wall suddenly appeared.

Hantel was beckoned inside. Eyes burned at him from beneath a gray cowl. The convict had sudden misgivings as the cave's mouth closed behind him.

"Where is Hoenbraun?" came the low hissed query.

"Dead!"

Hantel had spoken the truth. The blazing eyes held his own in a grip of fascination. Had Hantel wished, he could not have turned his head. It was his first encounter with the hypnotic eye. For a moment the Asurian maintained a steady silence. The convict was conscious only of the burning gaze which penetrated every fiber of his being.

"You are the man who was to escape with Hoenbraun!" the words fell in sibilant cadence which barely broke the profound silence of the gloomy chamber. "What happened? How did he die?"

Truthfully, Hantel gave a full account of the events on Phobos from the time Hoenbraun had given him the communicator up until the time they had entered the supply house together. At first, the convict faltered in his speech through sheer nervousness under the stare of his inquisitor, but as his story unfolded he grew bold with confidence. Perhaps the pistol in his hip pocket helped bring about this effect.

Hantel discreetly omitted Hoenbraun's discovery of his worthless sheeting and of the fight which had ensued. Instead, he related briefly of the explosion in the pile of

rocket cylinders and told how Hoenbraun had been buried beneath them.

"You have not told all!"

The words descended on Hantel like a bombshell. He was dumbfounded, terrified. Those accursed eyes! They probed the depths of his mind. He opened his mouth—tried vainly to expostulate. The eyes grew in size before him until he saw nothing else. He was talking, telling of the argument with Hoenbraun in the supply house, yet his lips were motionless. Of that he was dully conscious. Through his numbed senses, he heard the cryptic words of the Asurian.

"You will pay for your treachery!"

For the time being, his mind was no longer his own. It belonged to the gray clad Asurian. As if in a nightmare, Hantel followed him through dimly lit passages cut from the living rock. When he finally regained his full senses, he found himself in pitch black solitude.

Terrible impressions had been left on his mind. Hantel knew that the Asurians practiced human dissection. Subjects, however, were scarce. Here was one who had come to them voluntarily. He shuddered in the dark. Groping about him, his hands met a wall. He followed this to a corner. Four of these corners soon convinced him that he was in a dungeon. For a moment, he almost wished himself back in his cell on Phobos. Death was to be preferred to the living horror as an experimental subject for the Asurians.

● That he was in for some devilish iniquity, Hantel was positive. Hoenbraun had been important to them in some manner. But Hantel was not yet willing to accept death. Not while he felt that comfortable bulge in his hip pocket. Somehow or other he had not been relieved of his weapon.

The darkness of the dungeon turned to a drab yellow. Hantel saw that he was in a high ceilinged chamber—empty except for himself. A panel slid aside in the wall before him. A gray robed figure stepped inside. The escaped convict felt his scalp prickle as the smoldering eyes became riveted upon his own, preparing to lock his mind in another hypnotic spell.

Desperately Hantel resisted. Feeling himself slipping, he closed his eyes. With a mighty effort he snapped the Asurian's influence long enough to jerk the pistol from his pocket and fire wildly several times.

Blue spurts spat from the gun. The space ship scuttler relaxed suddenly, tottering weakly on his legs. The pistol clattered to the floor. He shook his head, throwing off a passing sensation of dizziness and then opened his eyes. There on the floor before him the Asurian lay dead. Snatching up the pistol, he leaped over the still form and into the passage beyond.

With ready weapon, vowing that he was not to be overcome again so easily, the escaped man from Phobos ran down the corridor. It was long and possessed many convolutions. Bewildered, he suddenly found himself in the center of a huge laboratory. Silent, industrious forms worked on all sides. Hantel raced for the nearest exit. Exclamations and cries of alarm broke forth from behind him, producing a bedlam of noise. Sounds of pursuit dogged his heels. Angrily, he turned and shot a fusillade of electric charges behind him, then continued running. He knew that the entire cult was now acting to prevent his escape. The sounds of pursuit increased as his pursuers grew in numbers. At one side of the passage, Ern Hantel discovered a narrow ladder leading up into darkness. Rapidly he ascended. A dark doorway greeted him. Beyond lay semi-gloom. Entering, he was no sooner out of sight when the grim horde of the hidden passages swept past his hiding place.

The room was dimly lit with the same drab yellow which had characterized the dungeon. At the side of the doorway through which Hantel had entered was a plate set in the wall. Studding it were levers and knobs which he readily assumed were for closing the panel over the opening. Fearing that someone might look in and discover him, he set to work closing the smooth fitting panel. He pulled one of the levers. The panel failed to work.

Instead, the yellow light of the chamber disappeared, yielding to complete darkness; then to the deepest blue tint Hantel had ever seen. It occurred to him that the particular lever he had unloosed was not for the operation of closing the doorway. What strange power had he unloosed? To the convict's ears came a strange humming.

His body became wracked with convulsions. Frantically, he reached for the lever to push it back again. Instead, in his haste and confusion, he pulled a different lever. The humming became intensified to a high, singing drone. His body became vibrant with energy, and the pains he had at first experienced disappeared, as if his body had become harmoniously attuned to the power. He made a lunge for the opening in the wall. The blue mist swam before his eyes. He could not find it, striking against the hard wall in vain. His hands met the plate with its number of levers.

For a moment he dared not touch them for fear of loosing something more frightful. The light was now intensely blue and very thick. He could see nothing clearly. His hands shook from the dynamic influence exerted upon him. He decided to take a chance. His shaking hands fumbled with the levers.

The blue fog disappeared. Once more the soft, yellow glow refilled the chamber. For a moment he sank to the floor of the dungeon in exhaustion. His ragged clothes no longer retained their old color. From a light blue they had been transformed to a dingy black. Before him he saw the opening through which he had gained access to this mysterious chamber.

Cautiously he peered out, craning his head to look up and down the corridor. Several puny little men patrolled each end of the dimly lit passage. Hantel wished above all to elude detection until the opportunity came for escape. He realized, however, the slim chances of escaping this hell's den.

He looked above him. The ladder he had climbed continued on upward into the deeper darkness. Noiselessly, hardly daring to breathe for fear of attracting attention from the little men below, Hantel climbed upward away from the illumination of the corridor.

He felt strangely weak and his hands still shook. That damnable blue light! It had set his nerves on edge. Higher he climbed. Finally he bumped his head against rock, cursing softly. Still clinging to the ladder, he felt about him in the Stygian gloom until his hand encountered a platform. From this, he felt his way into a tunnel, a rocky passage which sloped upward rather steeply. Hantel went cautiously on hands and knees. All was silent.

(Concluded on Page 730)

(Illustration by Paul)

Men recognized the futility of clawing at walls. Only those driven mad did that. Most of them dropped lifelessly. . . .

AT BAY IN THE VOID

By D. D. SHARP

● Those who have known the excitement of guiding a sailing vessel, in which great skill is required to take advantage of all air currents, will appreciate particularly this excellent story.

If rockets do not prove adequate for interplanetary voyaging, and it is necessary to construct some form of gravity screen, a situation will occur that will be analogous to guiding a sailing vessel. The trick in interplanetary voyaging will be to tack onto the gravitational pull of the various planets and the sun, adjusting one's course so that the maximum total pull is obtained from all.

Even though the differences between various methods of guiding a space ship would be at any instant small, still when a journey of 40,000,000 miles is contemplated, the net effect might be tremendous. This would be especially true if a ship were fighting in space for life or death and every second counted, as in the present story.

● Justin Bennet was Commander of the *Blue Rocket* in its race from Mars. It was the most trying trip he had ever attempted, although he had piloted many more dangerous and thrilling flights. In adventuring around the solar system he had anchored on ragged little asteroids where man had never before set foot, he had circled the two hundred and seventy thousand mile girth of Jupiter and had set a speed record from Mars to Earth that had not been approached by any other space pilot. But those adventures had been taken in the *Rover* with a volunteer, dare-devil crew.

In command of the *Blue Rocket* he had twelve thousand passengers in his keeping. They were men and women from every walk of life, who wanted the thrill but not the danger of adventure. It was his duty to bring them safely into dock, and yet he was racing against the *Meteor* of the Red Line for the right to carry the Martian mails. The prize was big, and the Blue Line wanted the contract badly.

Space flying had been made possible by gravity screens. The start was necessarily slow and the finish rapid, for speed depended upon the attraction of the destination planet, the square of its distance, and the skill of the pilot.*

The astonishing velocities Bennet had attained in his *Rover* were gained by a daring tack against the sun. That velocity once gained, in the vacuum of space, it could be maintained all the way to the planet of destination, by simply altering the direction of his course, using the gravity of the planet.†

But that was a dangerous game! Many pilots had attempted to imitate it but were unable to swerve their ships from the grip of the sun. Such tactics were taboo on all commercial ships.

Still, there was no doubt it was young Bennet's ability to coax speed from his ship that had given him his chance at the big interplanetary liner.

Until that time, Justin Bennet had known little about the business policies of his line. He was a spectacular figure, wholly isolated from the plodding business world. He was idolised by the force for his scouting activities on far frontiers and conquering of new worlds had given the Blue Line a legend of intrepid efficiency.

But the "Old Man," as A. T. Ralls was called, seldom complimented Justin on his conquests and this rather riled the youth, who was well aware of the fact that his feats of navigation had made the Blue Line a threatening competitor of the mighty Red.

Perhaps the "Old Man's" aloofness could be accounted for by the fact that young Justin's career had made a vivid impression upon Sylvia, an only daughter. He was probably afraid the old plot of young hero and owner's daughter might work out too well.

Justin wondered if Ralls was unbending when he was given command of the *Rocket* and promised a straight command if he brought her in first. Anyway he promptly forgave Ralls for whatever injustice he had suffered in the past. The command of a space liner was the dream of his youth. He was not out of his twenties and this trust was a sincere tribute to his skill as a navigator and his loyalty to his line. It was a post any space man might envy, but there were those who shook their heads at the Blue Line's choice.

Cassidy, the first mate, had been one of them. "Why?" he demanded of the committee, "Trust the defender to a youth?"

Cassidy wanted the job, of course, but that was not all. Cassidy believed the job was his by right, for he was the oldest, the most experienced and the most cautious pilot on the Blue Line.

Justin had not been placed in charge without much indecision, and consultation between the owners. His very reputation as a speed king was against him, as he was bold to the point of rashness. Courage and the ability to get from his ship all possible speed were important factors in his favor, but recklessness could not be tolerated. The ablest and richest men of two planets were constant travelers in these ships; thousands of lives were entrusted

*The gravitational attraction of two bodies depends upon their mass and is inversely proportioned to the square of the distance that separates them.

†In other words just as the skipper of a sailing vessel adjusts the sails to get the maximum effect of the wind in the direction of his flight, so Bennet steered his space ship to get the maximum pull of the sun and the planets to carry him to his destination.

to every voyage; but what was most valuable to the Blue Line, the ship, itself, was worth millions and its cargo many millions more. The loss of one ship like the *Rocket* would probably bankrupt the line, rich as it was.

Old Ralls, himself, impressed upon young Justin Bennet the grave factor of his youth, his lack of sobering maturing years. The old man cautioned him that while he was in complete command, he should give all due consideration to Cassidy whom they were placing as mate because he was the most cautious and skillful astronavigator they could find.

"No chances," Ralls had again reminded him as he stepped into the manlift that took him to the controls. "None whatever!" Ralls had shouted as he slid up into the well. "Speed to the limit of safety, but no tacking, not even if she's crowding you nose to nose!"

● Justin smiled at Ralls' anxiety. He knew how to play for safety when lives were in his care, as well as he knew how to disregard it, when adventure demanded. They need not worry. He would come in first and safely. He would not fail. That was out of the question for Justin Bennet. In all his brilliant and daring career, through all his strange and fantastic ventures, he had not once failed. Failure was not in the bright lexicon of this daring youth. Why should he reverse that uninterrupted line of achievement to fail now at the most vital crisis of his career? It was unthinkable!

He looked at Cassidy calculating the distance to earth.

"Less than six million," Cassidy rumbled and still he did not smile.

Justin relaxed for the first time during that driving forty million miles they had already covered. They were half a day ahead of the *Meteor*. So far ahead Cassidy growled out an opinion.

"The *Meteor* just isn't in it with us for speed. The *Rocket's* got her beat a dozen ways."

Justin was young enough for that unfair comment to hurt. He knew it was his skill which had put the *Rocket* in the lead and Cassidy ought to acknowledge it.

"You'll have to admit I didn't lose any time," he said mildly, and turned his attention to the depths outside the observation windows.

With all the years Justin had piloted in the void, the great depths of the cosmos had never failed to enchant and impress him. It was as though he were on a magic carpet which had completely dissolved the earth from under him and left only the surrounding heavens. Yet, instead of day, as one would expect with the white sun full in his face, the heavens were sooty black, showered with brilliant stars. Night was everywhere except the sunny side of the big liner, which revolved its starboard and port into night and day like a madly rotating earth. The ship spun around and around as it drove through space, to give artificial gravitation to those aboard.*

Justin slid out of his control seat and turned the ship over to Cassidy. For the first time since beginning the flight he ventured into the gay, carefree brilliance of the salon. It had garnered a large and distinguished company. Here and there was a Martian, but most of the company were outstanding intellectual types from Earth. The Martians were of inferior intelligence. Large of features, flat of face, dull of eye, they were slow-witted and dense, but they made good servants. There were many of them in the service of the *Rocket*. But Mars was a rich planet, rich in valuable minerals. Most of those guests from the Red Planet had acquired their fortunes from land holdings rather than by ingenuity.

It seemed to Justin he had never seen a scene so gay. Guests and servants beamed their knowledge of the *Rocket's* triumph. They knew that young Bennet had again made Interplanetary history. In less than a week they would reach earth after having experienced the greatest thrill of their lives. So merry laughter and light-hearted banter bubbled from every group.

Someone recognized him. There was a flutter of hand-clapping which spread to all parts of the salon.

Justin saluted and smiled. The anxiety about the race had slipped from him. In his heart was the warm glow of triumphant youth. He was about to join a party of friends when an orderly hurried into the salon, and signaled.

He nodded and strode to the nearest escalator. He knew something was wrong.

● In the control room he lost his carefree air. He became stern and cold, and steeled for any emergency.

"What is it?" he demanded.

"A Martian vessel, the *Katjako*," Cassidy said with a yawn to emphasize his unconcern.

Justin felt relieved. If anything had threatened the *Rocket* Cassidy would not have yawned.

"What does she want?" he demanded, a new fear seizing him. "Is she in distress?"

"Best I can make out she has no meteor shields. Got it broadside. Can't last more than ten hours. The *Meteor* will probably pick her up, no need for them to be in any heck of a hurry now."

Justin granted Cassidy a scowl.

"Not more than ten hours, you say?"

"That's what she says, but Martians are great liars. And some navigators, I say, are trying to save a little money leaving off meteor shields. Got it coming to them, the fools!"

Justin was at the helio before Cassidy had finished. He picked up the *Katjako* easily. She was hardly five thousand miles astern.

"Air leaking," he made out, "wounded in lower hull, earth screen gone. Four thousand souls aboard. All Martians bound for earth on labor contract."

"It's just a dirty Red Line trick," Cassidy growled. "Let them pick her up."

"I'm not so sure about a trick," Bennet objected. "I can see wreckage around her, look!"

He switched the telescope binoculars to Cassidy's position.

Cassidy granted him a wide-eyed stare. "Say, young fellow," he demanded, "you aren't considering? You can't! Why, they're just a mob of flat-faced Martians!"

"They need help, Cassidy. It's the code of our trade to succor any vessel in distress and count no costs. We've got to turn back. We've got to lose this race."

Justin's face was ashy gray. His heart had dropped down into the very soles of his feet. He was taking his first defeat, but he was taking it like a man. Already he

*It might be well to explain that the cabins were built around the inside of the hull, like cages inside a Ferris wheel. As planetary gravitation was screened off, the ship was rotated and the centrifugal force from its motion put the center of gravity in the circumference of the hull. This automatically swung the floors of the cabins against the hull. As landing time approached and the ship ceased rotating the floors automatically swung back toward the gravitation of the planet on which landing was made.

The gigantic main salon was along the belly of the ship, so that no change was necessary in its position whether spinning in space or floating down to earth.

was at the controls closing down the earth screen, calculating against what pull to veer for the *Katjako.*

Cassidy strode up to where he sat. The gray eyes were level but gleaming like a wolf's above its spoil.

"You can't do that," he snarled. "Let the *Meteor* pick them up."

Justin indicated by neither move nor word that he had heard Cassidy's demand. He eased up the screen which covered Venus.

Cassidy's great hand, blue-veined, shrunken, but powerful gripped down upon the controls. He swung the lever back and straightened himself as Justin leaped to his feet as softly as a panther.

Cassidy shrank before Justin's cool anger. He shrugged his shoulders and said rather tamely.

"You're an impulsive young fool. The *Meteor's* running hell for earth. She'll pass us before we get half of those animals aboard. If you can't stand the gaff let me have control!"

"I'll do nothing of the kind," Justin growled as he slid back to the control seat. He swung out the Venus lever. In the black panels about the switches he saw Cassidy behind him. Justin closed the earth switch and saw Cassidy edging toward the door. He heard the thumb-lock click. Then Cassidy's deadly earnest command, "Gangway there, before I brain you with this wrench, and drop you out the garbage chute!"

Justin did not alter a muscle. He went steadily about his exacting task of altering the *Rocket's* course to haul alongside the crippled ship, but he could see Cassidy's arm raised and a wrench gleaming under the lights.

"Better not, Cassidy," he advised coolly, "I've been watching you of late, and I've circuited two hundred and fifty thousand volts into this control bar. You'll short it if your wrench comes much nearer."

Cassidy hesitated. Caution was the ruling trait of his character. It was evident that he believed Justin was pulling a fast one, but he did not know. Justin rang for an orderly. He set his controls and calmly covered Cassidy with his gun. "Sorry, but I'll have to hold you in the ship's gaol until we reach port."

Cassidy's eyes narrowed, but he said nothing as Justin unlocked the door and ordered Cassidy's arrest.

Nose to nose anchored the mighty liners of the void. Justin, himself, was the first to enter the *Katjako.* There he arranged for transferring passengers to the hold of the *Rocket* and to tow the derelict to Terra.

The stream of drab Martians was still flowing into the *Rocket* when a streak of light passed across the black sky. The *Meteor!* She was rushing on to Terra!

Justin was past feeling. All the honor, the glory, the reward of the race he had certainly won, would go to the rival ship! What a jest of Fate!

Captain Mjkaj, of the Martian ship, recognized this, and saluted him with an humble, admiring deference as the *Meteor* shot past and faded into the void.

CHAPTER II

Fired!

● When the *Rocket* finally settled to the Blue Line docks days later there was no roaring mob of admirers to welcome it. No wail of whistles and raucous honking of sirens. The helio was the only telegraph of space and its radius was hardly a million miles, Justin could send no word of his delay. All Earth knew was that the *Meteor* had come in first from the void.

As the ship settled to her stall Justin saw the litter from last night's welcome of the rival ship. There were red streamers, red pennants, and a shower of reckless confetti radiating from the Red Line stalls. It was a drab reminder of the *Meteor's* homecoming, far different from his own. Only weary relatives and friends of the passengers waited mutely for the docking of the ship.

This was the first time in all his adventurous life that Justin Bennet had returned from an undertaking with no shouting and tumult to greet him. To the devil with that, he looked for a slender girl with binoculars at her eyes, waiting in the crow's nest to be the first to greet him; and she was not there. The earth suddenly became as lonely and vacant as the void.

He left the ship and threaded the crowd flowing toward the gates. Passengers stared at him as he strode past. Pity? He wanted none of it. He had not failed. He had lived up to the highest measure of his code.

But why was Sylvia not there to meet him? She was not the kind to abandon him even if he had cracked the ship. Even her father could hardly have influenced her. He did not doubt Ralls was sore, but he would relent when he learned the facts.

He reached the gray office building which flanked the yards his eyes still alert for a snug little toque above the shoulders of the anxious mob. But Sylvia was nowhere to be seen.

He pushed open the door to the private office of A. T. Ralls. Ralls was standing with his back to the door facing a circle of frowning associates.

"Greetings, gentlemen" Justin began soberly, "This is hardly the finish I expected to make. I suppose even my run of good luck had to break sometime."

Ralls wheeled to face him. His eyes bulged and blazed. His lips were thin and tight. He seemed incapable of speech.

Justin straightened his shoulders a bit stiffer than even their soldierly custom. Of course Ralls was hot. The Blue Line had lost heavily and he was still unaware of the cause. He believed that Ralls would feel better when he learned the facts.

He stepped inside the railing and found Cassidy scowling at him from behind a steel cabinet. Cassidy's expression revealed quite clearly that he had told his tale. Ralls was not bursting with rage because he was ignorant of the cause of the delay but because he was aware of it. Justin felt a second disappointment. He had known Ralls was a hard man in financial affairs, but he was hardly prepared for this fury in any ship-owner whose ship had rescued a vessel in distress rather than win a mail contract.

He let his puzzled gaze circle the little group of managers. Each was a scowling beast. They reminded him of the story of the lions with closed mouths in the den with Daniel. Well, let them roar.

"You had that race won, Bennet," one of the more composed men finally barked.

"Deliberately threw us over," Ralls bellowed finding his voice.

"The *Katjako* asked succor, Mr. Ralls. She had air for only a few hours. I salvaged her, sir."

"The *Meteor* could have picked her up," the cold voice of the composed man said.

"I do not know that she could, or would. We were first

to get their call. By the code of the cosmos I was honor bound, sir."

"You double crossed the Blue Line!" Ralls bellowed.

"Pardon me, I rescued a distressed ship."

"A miserable lot of Martians."

"You are glad enough of their business," Justin shot belligerently. "It is their planet and their labor which gives the Blue Line its largest revenue!"

"It was our money which paid you, our ship you piloted, and our race you were paid to win!" Ralls shouted.

"But, Mr. Ralls, humanity?"

Ralls became calm, deadly so. He drew back his shriveled lips until they were as white and lifeless as the artificial teeth behind them. "Your duty is to your line first, last and always. When it comes to a mail contract, humanity be damned!"

● Justin stared unbelievingly at his old employer. Something in his very amazement seemed to rile Ralls to greater fury. "Get out!" he bellowed, "and don't come back!"

Justin stood petrified, staring stolidly at the infuriated man. He could hardly believe that Ralls was discharging him like this. He had not expected to retain command of the *Rocket*, but he had expected all possible consideration of the dilemma he had faced and his past service to his company. He had never haggled for pay, he had loved the service, but now to be kicked out? He could guess what that would mean!

No line would hire a discharged pilot. The position was too exacting. There could be no shadow of smirch upon a space pilot's efficiency. No company wanted to take another's discards! He had been kicked out heartlessly and unjustly. It bit at him and he kicked back.

"You Blue officials are snakes," he exploded bitterly. "You are insensible to gratitude or even common justice. You fang whatever disturbs you and it doesn't matter if it happens to be the hand that helped you up. Take your your job and stick it with your dollars. I wouldn't ask the Blue Line's help if I was wrecked in hell and you were begging to pay my way out!"

He turned on his heel, proudly, somehow he had forgotten that Ralls was Sylvia's father. She seemed so foreign to him. Whatever Ralls might do he knew Sylvia was his, sure she was.

She was waiting in the rear seat of his car as he reached it. There was a mist upon her lashes, but her small jaws were set and hard and her eyes smiled defiantly.

"Just drive around," he told the chauffer and took her into his arms. "Lord this is good," he whispered.

The car slipped down the river drive. Lights twinkling in the black water reminded him of those in space.

"You didn't come to meet me?" he asked after a while.

He felt her arms tightening about him as though she was assuring herself that he was really there. "I couldn't, Justin," she whispered, "I promised I would never again if daddy gave you the command. I knew your heart was set on it."

He pondered that.

"You wouldn't have kept it," he said aloud. "You've broken it already!"

Her arms tightened about him.

"I heard everything. I was there in the filing room. That's why I waited in your car. Daddy's not like he used to be when mother was alive, Justin. He is money mad and the more he gets the more it possesses him. I used to be so proud of him, he was such a bold and determined man. He used to own his line, but now the line owns him. He's harder than ever I thought he could become. The only soft spot left in his whole heart is for me, but he is good, Justin. He is, way down."

He patted her cheek. He was still smarting under Rall's treatment. He could think of nothing he wished sincerely to say.

"Justin, don't stand for him," she said straightening from his embrace to stare with earnestness through the darkness. "Don't go back! I don't want the Blue Line to set you in its mould. Business is the science of trade. It should not include human relations. Your success has been daddy's success, but he has forgotten that. He is hardly human to anybody in the whole world but me. He's not at all like the great hearted Captain Bennet!"

Justin shook his head absently, watching the stars on the black water. "Not Captain, Sylvia. Not even of the *Rover*."

"That's not like you, Justin!" she cried, "Why you're almost sorry for yourself. *You?* Can't you see you have every reason to feel more proud today than ever before in your life? Can't you see that rescue was a test of what you valued most, honor or success?"

Whatever the rest of the world thought, after that night Justin and Sylvia had a better understanding of each other. Justin was sure she was loyal to him and also to her father. He felt a bit sorry for her, caught between them. On the other hand he knew that she was the one soft spot left in Rall's nature, and she was the one thing in all the world which kept him upon going ahead to greater achievements despite the handicaps.

● Considering the way Ralls had taken his efforts to save the *Katjako*, Justin was surprised and infuriated to find a long column in the morning press signed by A. T. R. himself. In it the old man expressed a deep satisfaction at having been able to serve the Martian vessel, though it did result in the defeat of the *Rocket* in its attempt to win the mail contract.

"Humanity," he stated, "Is the watchword of the Blue Line, and any one taking passage with us will find that out."

Ralls was crafty. He was doing all he could toward turning his loss to profit. Losing the big contract had galled him to the point of firing his most promising pilot, but not so far as to refrain from reaching for Martian dollars with a play like this.

The whole deal was unfair! Justin shrugged his shoulders and dismissed it. After all traveling in space gave a man a rather humble sense of his own importance, or the importance of his affairs.

A week later Justin was further chagrined to learn that Rall's play to the grandstand was having far reaching results. It's appeal had touched the simple hearts of the Martians. The Interplanetary Mail Commission of Mars refused to certify the *Meteor's* victory and stated that since the humanitarian policy of the Blue Line defeated the *Rocket*, (after she was sure of the race) the decision of the Commission was that a new race should be run.

Justin's blood tingled. Due to his spectacular speed and his distance ahead when he turned back, he half expected Ralls to ask him to again take command. He

wanted the satisfaction of telling him what he could do.

But he had played the *Rocket* too well against his opponent. He sat musing in his library waiting a turn of events when the phone rang. It was Sylvia. Her news was ironic. The very distance the *Rocket* had gained over the *Meteor* favored Cassidy's contention that the ship, and not the pilot, had given the lead. Cassidy had been placed in command. Justin took that to mean that Ralls was making certain nothing in heaven or earth should beat the Rocket from its race this time if it gained the lead. Justin was sure it would gain the lead if the Red Line could not put up a faster vessel than the *Meteor*.

Cassidy had understudied Justin's tactics during the last flight. And, while the great lead of the *Rocket* was certainly due to Justin's skill, there was no doubt that the *Rocket* was better built for speed. Unless some accident happened Cassidy would win, and Justin was human enough to want him to lose. His sense of justice demanded that the tactics of the Blue Line must fail. But the chance of it seemed very remote.

"Listen," Sylvia demanded, "I want you to go over to the Red Line offices and ask Mr. Andrews for the *Meteor*. If you go after it he will give it to you. He knows what you can do with a ship. That mail contract means a lot more than money to him. He wants to beat daddy's ship in this next race, as much as daddy wants to beat him. Without you Mr. Andrews knows the *Meteor* hasn't a chance."

Justin whistled. What a girl Sylvia was, and yet she did not understand.

"You're an ace," he said, "I understand what you are doing for me, and it isn't right for A. T. and myself to play tug-of-war with your heart in this."

"I'm in dead earnest, Justin," she answered in a lower and more sober tone. "Daddy's got to lose this time. He's got to find out what it means to pay for cold-blooded acts. Now Daddy's all right. He's great, but he's had it too easy with you to help him. He's won at everything he's tried. For my sake, for his sake, and for your own sake, Justin, you've got to ask Mr. Andrews for the *Meteor* and win. That's why I called."

"But I can't, Sylvia! I'm a Blue Line discard. Andrews would give me the horse laugh!"

"You're just too sensitive," Sylvia tried to laugh and ended by saying seriously, "No one believes you are down, not even you, yourself. I'm coming over."

She hung up. Justin stared at the walls. Of course it was out of the question for him to ask the Red Line as Sylvia requested.

A few days later T. P. Andrews, himself, called and got quickly down to business. He explained that he had just learned that Justin had been discharged for going to the rescue of the *Katjako*. What Ralls' business policy might be was no concern of his, but he knew Ralls pretty well and he had watched Bennet's career. The fact that Ralls had discharged him for rescuing a ship was no smirch. It was unjust of Ralls and an injustice to every space ship that might sometime need help. He believed as firmly in Justin's ability to win a race as he ever had, and he believed he was the one pilot who had a chance of bringing the *Meteor* in first in the coming race. Could Justin take command of the *Meteor* without violating any contracts or agreements with his old employers?

"Could he?" Justin asked nothing better than to race against Cassidy.

After he signed with Andrews, he and Sylvia agreed it would be best not to see each other until the race was over.

CHAPTER III
Neck and Neck

● Two months after his parting with Sylvia, the *Rocket* and the *Meteor* were anchored in their mammoth stalls waiting the signal to dash for earth.

The hills of Mars beyond the take off port of Tjkla swarmed with Martians. Colors were worn by the boosters of favorite lines. Among earth folks the blue and the red were almost equally displayed, but among the Martians blue was overwhelming.

The Red Line officials were puzzled. Did the Martians know that Ralls had discharged Justin Bennet for going to the rescue of the Martian vessel? Did they know that Justin was now piloting the Red Line *Meteor?* Of course they did not. They were boosting the blue because they believed she had lost the first race by reason of a humane policy of the line! Ralls was crafty. He undoubtedly had fostered that impression.

But that could not win the race. In space a man's work is done to no grandstand audience, but to the silent stadium of the stars.

Both ships were booked to their limit. Passengers were already aboard when Justin swung into the manlift which took him up to the control room.

Captain Stolings, his mate, was waiting beside the controls. He was an efficient, quiet type. He smiled, shook hands, and pledged Justin all possible support to land the *Meteor* on Terra ahead of the *Rocket*.

Lights in the field changed color as they talked. Justin made sure all was in perfect order. Lights changed again. He signaled warning for the start.

Then the white flare—go! He swung on the gravity screen against Mars and drew a focus on Terra.

The giant power of the sun was there with its temptation for a swift getaway, but greater than the temptation was Justin's sense of duty to his passengers and his ship.

Crest to crest the space liners rose as the big airport shrank away. Came a mighty roar from lusty throats which could be heard through the insulation.

Mars and its canals and its two moons fell tumbling into the sky.

Cassidy edged ahead, Justin scarcely took his attention from the controls but he could see the *Rocket* in his field mirror.

He fought for lifting power, handling the gravity focus with a skill and daring peculiar to himself, but still the *Rocket* nosed ahead with a zigzag of its lights. Cassidy was not exactly tacking, but he was playing, for all the power the sun would yield, to a straight earth flight. It was a trick of Justin's own devising, and it was driving the *Rocket* ahead. There was no question that that ship was a marvel for commercial speed. But Justin had a trick or two left in his bag which he had not needed in the first race. He smiled at Cassidy's cunning in stealing his thunder and determined to show him a few bolts of a different kind before the race was over.

Hour on hour the *Rocket* and the *Meteor* raced neck and neck. Justin ate little, slept not at all. He was fighting every minute of those long unchanging periods of time, fighting for any edge he could get over the faster ship.

Mars was but a brilliant star in the deep heavens, when he finally managed to slip his ship ahead.

Cassidy was unable to defeat his move. The *Rocket* fell astern, lost place until its revolving lights became a blur. Justin worked tensely spurred by his success. He felt the thrill of victory, sweat beading his face. He heard the music of passengers cheering from the salon, from the cabins, and even the steerage. They, too, were getting a kick and Justin played up to it. He put into the race all the ingenuity which had made him a king of speed. The *Rocket* slipped back and back until it was but a dim star against the sky, even through his telescope binoculars.

The door of the control room burst open. Justin, pale and tense from the strain of battle, wheeled to gape with open eyed surprise.

"Sylvia?" he breathed as though he doubted his eyes. "You? On the Red Line?"

"I couldn't wait," she cried and danced over to where he sat. "I had to come over on the *Rocket*, but I wanted to go back on the winner, so I took the *Meteor!*"

She danced back, halted, erect, slim, pretty. She shook her small head defiantly and with a sparkling vivacity in her eyes she tossed her handkerchief into the air in mock abandon.

"Hurray! Hurray!" she shouted.

She plucked the Red Line insignia from Justin's cap and pinned it to her own little toque. She strutted back and forth.

Justin watched her with keen admiration. Sylvia was loyal to her hero against the world, and she suddenly seemed to catch the other's thought in his mind.

"Won't daddy be furious," she said a bit weakly after her elated demonstration.

● He smiled and took her in his arms. "The race isn't over, dear. We're a bare ten million miles out. Cassidy won't be easy to lick. He knows I'm in command and he's bragged that the *Rocket* is the better ship. He hasn't an excuse if he loses and he hates the Red Line. He'll fight as for his life. He'd do anything to win!"

"But there's nothing he can do," she flung and then more doubtfully, "Is there?"

"If he can get the speed out of the *Rocket* that's in her, the *Meteor* hasn't a look in, Sylvia. Your father knows how to build a ship. But Cassidy is bound to his groove. I think I can outpilot him."

Stolings came in. He first stared and then raised his cap to Sylvia. "The *Rocket's* a sector astern," he announced. "We'll beat her by a hundred thousand miles!"

"I hope so," Justin smiled, but he knew it was much too early to smile. Yet, things were going rather well.

He took Sylvia by the hand and led her over to the companion seat at the controls. Stolings saluted again.

"Aye, aye, sir! A woman's the natural mate!"

But, a few minutes later from far down in the hold there rose a whistling scream which mounted to a hissing roar.

Justin was on his feet, for a moment the girl was forgotten in his thought of his ship. And then she was first in his thoughts.

That wail was the nightmare of every pilot in space.

Escaping air! The life breath of every man and woman aboard! It could not be replaced until they reached Earth or put back to Mars.

Automatic compartment sealers banged as they cut off the wounded portion of the ship. Had a meteor been able to crash the deflecting shields to crush the ship? No! There was a new wailing nearer at hand. A buzz of distress signals calling for guards. Muffled orders drifting up from below! This was a villainous attack from the inside.

Ralls? He shut out the thought. Even Ralls would not stoop to such a crime.

He tore himself loose from Sylvia's nervous clutch and rushed to a manlift. He dropped through the long dark well and plunged into the panic of the salon.

Men and women were first paralyzed and then hysterical with alarm. The crew moved among them with a calm, soldierly precision which assured the passengers more than words could do.

When Justin came into the salon the scream of air had stopped. The vessel was in no immediate danger. The automatic sealers had been effective in isolating the damaged compartments.

Justin crossed the salon and entered an aisle which led to the storage rooms. That had seemed the sector in distress. He met a group of guards. They had two prisoners, Martians, stoical and brazen.

"We got 'em," a guard bellowed. "They've blown the oxygen reserves into kingdom come!"

The Martians caught sight of Justin. They stared with sagging jaws and startled eyes.

"Captain Bennet!" one of them gasped in the Martian tongue. His eyes searched Justin's cap then took in the Red Line uniform. "We were to make sure *you* would win," he added limply as though beginning to understand what he had really done. "We were willing to die for one who had served Mars.

"You rescued four thousand of our citizens. We volunteered to see that you did not lose this time. We were miserably misinformed!"

"Yes you were misinformed," Justin said severely. "I am now the Captain of the *Meteor*, and I wanted to play the game fair. The Blue Line discharged me for making that rescue!"

He saluted the guards stiffly and ordered the Martians to cells.

He got Stolings by phone. "Reverse direction," he ordered. "We've got to put back. Air won't last twelve days."

When he opened the door of the control room Stolings was pale and grave. "The Mars screen controls are severed. The explosion has made it impossible to put back, sir," he said.

"What is our velocity?" Justin demanded.

"Ten miles a second, sir."

Justin did some quick mental calculation. At ten miles per second they would make thirty-six thousand miles per hour. The *Meteor* was doing its best. There was simply no more speed in her. There would come, of course a constantly increasing velocity as Earth's gravitation doubled and redoubled in accordance with the ratio of the square of the distance. But he could not hope to make better time than twenty days.

There was but one thing to do, and that was to appeal to Cassidy. He remembered his own parting shot at Ralls, and he could guess what satisfaction Cassidy would get when he begged for help. He'd have gasped his life out in the void, if there had been only himself, but there were his passengers—and Sylvia.

● He closed the earth screen to cut down his velocity. Then he scratched out a message:

"S. O. S. Captain Cassidy commanding the *Rocket*. *Meteor* in dire distress. Air reserves gone. Mars screen jammed. Can't put back. Must have additional oxygen for ten days at least."

He took that to the helio room. Sylvia followed and was standing beside him as the helio operator sent the light flashes across the void in the direction of the *Rocket*. She watched intently as the operator's machine ground out Cassidy's reply, which the latter had sent on his private non-recording device.

"Helio Mars for help. The Blue Line isn't begging to pay your way out. Naturally I am keeping no record of this message."

"Brute," Sylvia breathed, "He knows the helio hasn't a radius of a million miles!"

Justin put a protecting arm around her. She was trembling. He swallowed Cassidy's slap. This was no time for bickering. He scratched out a reply.

"I ask nothing for myself. For God's sake, Cassidy, consider ten thousand human lives!"

Cassidy's next answer was as short and terse as his first. Again he flung that interview with Ralls into Justin's teeth:

"When it comes to risking a mail contract, humanity can be damned. This is also off the record."

Sylvia flushed with anger. If she thought of her peril there was no hint of it in her tone.

"He's bluffing," she exclaimed, "He knows daddy did not really mean that. He'll stop when he comes alongside."

Justin hoped Sylvia was right. Certainly Cassidy knew that Ralls had not meant what he said if "humanity" included his daughter. Should he inform him that she was aboard the *Meteor?* He decided Sylvia's escapade should not be revealed except as his last card.

Stoically he waited the outcome. He made out the dim star of the *Rocket's* light slipping across the heavens. She was moving fast. Soon he made out the whirling of her windows. She was zigzagging for more and more velocity. Justin knew then Cassidy had no idea of halting. He was determined to win.

The *Meteor* picked up her old velocity as the *Rocket* nosed upon her tail and passed as silent as a whirling phantom.

It was then Justin scribbled his final appeal.

"Cassidy, you've got to haul to. Sylvia Ralls is on this ship."

"What do you take me for," Cassidy helioed back.

Since he could not turn back, Justin was forced to drive ahead. He was more than thirty million miles from Terra. The air in the tanks would last no more than twelve days, if that.

He called the air engineer and ordered but a thin stream of oxygen doled into the ship. That was all he could do. That and drive for earth with every ounce of velocity. It was a hopeless race. Thirty million miles in twelve days. Impossible!

He stared up at the steady, silent eyes of space watching the hopeless struggle. What a monster space could become! Sylvia slipped a sympathetic hand into his. He turned a haggard face to hers. For once he was up against certain defeat. His goddess had turned away when he rescued the *Katjako*.

"Why did you have to be aboard?" he cried rebelliously.

"My duty is with my captain," she said with a little salute.

"Thirty million in twelve days," Stolings said aloud and shook his gray head. "Not in astronautical history!"

"I came within a day of it in the *Rover*," Justin replied, thinking of the effect on Sylvia.

"A day dead, is dead forever," Stolings shrugged despairingly. "Taking the chances you did then, even tacking five degrees to the sun, you couldn't beat that record."

"I'll take bigger ones, Stolings. Order every man to stand by. We'll drive straight into the sun and see if God and gravity will play our game fairly."

He slid open the sun screen. The *Meteor* swung starboard eleven degrees and fifteen minutes and her nose pointed straight at the small white sun. The velocity needle quivered, became suddenly alive. For long hours it had hung to the ten mile digit as though it were glued there. Now it crept forward.

"Good God, Bennet!" Stolings gasped, "Good God!"

CHAPTER IV

A Race With Death

● At twenty-five miles per second they were moving almost as fast as the fastest planet in its orbit around the sun; ten times faster than a rifle ball, and yet earth, even, at this speed, was eighteen days away at best. The ship would be a tomb of the dead long before it could reach earth.

The needle slipped up to thirty and Stolings clamped a detaining hand on Justin's wrist.

"Stop!" he growled, "Good God, man, you are exceeding reason. Above twenty-five the sun can't hold a body in at the distance of the earth."

Sylvia said not a word. She sat white and stoical. She had an unfaltering trust in her hero. Any other man at those controls would have left her limp at a glimpse of the indicator, but Justin. He was unfailing.

For three days Justin drove straight toward the sun, the arc between the earth and the sun widening to his sextant. For three days Justin sat like a man of iron, and Sylvia never left him but to bring him sandwiches and coffee.

Outside the control room everything went smoothly in the old routine. The passengers knew an accident had occurred, but they guessed neither their plight nor their velocity. Having no idea they were pawns in a race with doom, they laughed, flirted, bargained, played cards and ate sumptuously, aware only by the lessened supply of oxygen of the drama taking place at the controls.

But on the fourth day the air in the salon began to be troublesome. There were finicky, querulous complaints from the hothouse variety of folks who had always controlled the elements of their comfort.

Justin sat unmindful of any ordinary matters of life. Tense as a bow string, he waited the turning point of his headlong plunge.

Stolings approached him. "What's the use, son," he said with the formality of ship life melting in the tension of their peril. "Our air is failing faster than we judged."

"Let the passengers know," Justin decided. "Ask them to be courageous. We may yet win and they've got to help by saving oxygen in every way. There must be no smoking at all!"

When Stolings was gone Justin pulled the sun screen wide open. The velocity needle took up its thrilling walk again. Forty miles per second.

Stolings came back. He glanced at the dial. He shrugged fatalistically.

Earth's orbit approached, with the earth at a wide angle from the line of flight. The mad plunge had reached its ultimate. The hour had come to swerve. Justin had forced his ship to the last possible mile per second that he dared. Yet their race with suffocation was still of doubtful outcome. One day, one hour more to earth might mark the fate of all on board.

He closed the sun screen and pulled open the one to earth. And still the needle crawled along the dial!

Justin stared unbelievingly. Earth screen was wide open. Still they were accelerating *toward the sun!* They were lost! Plunging on! Earth's gravity had not turned the course of the ship, with the sun screen closed tight!

Or was it closed? Had the ripped hull also jammed the sun-screen controls?

He leaped from his seat.

"Stolings!" he shouted, "Can you take her in?"

"What do you mean?" Stolings demanded.

"Justin!" Sylvia screamed and locked her arms about him. "Justin, what are you going to do?"

"Get hold of yourself, girl," he said hoarsely. "I'm not going to kill myself. I'm sane as I ever was. Now there, get hold of yourself."

"Stolings," he said calmly, but his voice betrayed the strain from the hazards he had taken, "the sun screen's jammed. I don't know what good I can do, but I'm going to try to break loose the obstruction. It's a chance, anyhow."

He picked a sledge from the emergency closet. Then got out his air suit.

"If I can't get back, and the screen gives, use Jupiter to help divert your course from the sun. Mars too, but be careful of Mars, it might swing you off your course and every hour counts now.

"Don't screen off until you are quite near. It's a chance you've got to take. Then you can play the sun to put you in a spiral and take her out of it with earth shut off tight."

Sylvia flew to him. That was too much like saying "Farewell." She clutched him frantically. "Justin," she begged, "Don't leave me alone out here. You can't go. You can't, I tell you!"

● "Let me slow down rotation," Stolings suggested.

"No," Justin decided as he got into his airsuit. Passengers are already jumpy. Can't say what effect the weird feeling of no weight might have. I'll make it all right. After all there is very little danger to me."

"I won't let you go alone," Sylvia cried defiantly. "I won't stay back."

"Sylvia," he whispered, "Where is your fortitude? Is this the conduct of a space-mate?"

She drew erect. Her eyes were dark and deep. In her face was all the worship she had for Justin, space daredevil and hero, and in it also was the hungry love of a sweetheart who was sending him to his duty.

She smiled, a wretched little smile, as she helped him adjust his helmet and fitted the compressor which raised the pressure inside the suit.

Justin threw her a grotesque kiss from his goggle-eyed helmet and she followed him into the exit chamber. There she had to turn back before he let himself out into space. She watched through a cerelum window.

He lowered the air to vacuum and then slid open the exit.

The stars went around and around the ship in a giddy stream as he swung out to catch the rail of the catwalk. There would be no walking, centrifugal force swung him from the ship. Every direction was down, a vast emptiness beneath him.

He slipped his sledge into his belt and swung out, hand over hand, along the rail.

Stars stared up and down from the shadows as though he hung above a far-away black and tranquil lake. He remembered the caution of the steel workers: "Don't look at your feet!" He kept his eyes upon the overspreading hull and worked his way along the rail. The strain upon his hands grew unbearable. The muscles of his arms ached and his fingers were bloodless, and numb. He found a screen rod below his knee. He swung a crook of his leg about it and hung, breathing heavily. The sledge slipped from his belt. It plunged into giddy emptiness and vanished from sight.

After a brief rest he worked on down to the jammed screen. The ripped metal of the hull had broken a catwalk-brace. The brace had not interfered with opening the screen, but had caught as the slide started back.

He doubled himself across a rod and kicked with his heavy boot. The brace refused to yield. He kicked hard, with both feet. The rod gave. He slipped, clawing for something to stop his fall. He caught the screen rod over which he was doubled. It was oiled for easy working. His gloved hands could not hold. He caught the broken catwalk brace. It was not more than half an inch in diameter, and was loose at one end. He got a grip on it, but it bent, slowly, his clutching hands slipping toward the end until it crawled from his grasp.

He clawed at empty air. Long rows of lighted windows fell past, leaving him in emptiness, alone. There were faces at the windows, wide-eyed and startled as he dropped past, into unending emptiness. He tried to be resigned as he wondered how long he would live falling through infinite lonely vacuum.

Instead he felt a jerk upon his belt, a feel much as though a parachute had spread. He hung heavily an instant and then weight seemed to flow out of him. He looked up at the overspreading ship. A small steel cable stretched back to the nose of the vessel. It was fastened at his belt, one of those cables flung down to the ground crew at landing time.

Sylvia? She had kept her wits after all. He craned back his head to look up at the ship. It was coming to meet him. His cable was winding around the figurehead at the nose which was moving slowly in comparison to the windows upon the hull.

Sylvia and Stolings were at the entrance in air suits, reaching out to guide him to the rail, for that side of the ship was in utter darkness. Sylvia unsnapped the hook from his belt.

Even as he drew himself into the ship he noticed the sun creeping around to the side of the vessel. The sun screen had worked. They were swerving toward the earth!

Inside the control room again, Sylvia went back on all her traditions by slumping to the floor, white and limp. Stolings himself was so shaken he could hardly get out of his suit.

Sylvia was not hard to revive. She nestled in Justin's arm, her eyes deep and searching.

"How do you like space fishing with reel and line?" he bantered, trying to relieve her tension.

"Justin, it was dreadful. I did not know that your belt would hold. And then I saw you fall!" She buried her head in his arm and shuddered.

● He smiled. "Why didn't you let me know the line was there?"

"I didn't dare," came the muffled answer. "I was afraid it wouldn't hold, and I didn't want you to take too much risk."

"Only the big ones get away," he teased.

"But it's only the game fellows one has to reel in," she came back trying to rise to his lure but her voice was still trembling.

"We'll have to check velocity, if we're to land safely," Stolings warned from his post at the controls.

"Let her keep all she's got," Justin decided and got out of his suit. "We'll spiral until we regain control. Just so we hit atmosphere slow enough to keep from burning up, we can funnel our descent."

But Justin's problem was far from solved. Fast as they were rushing earthward, Terra was still far away and space with its unrelenting terrors had them in its grip.

All over the ship men and women sat like pale shadows with faces pinched and blue as they gasped constantly. Late that day (counting day by the chronometer) a guard caught one hysterical man with an emergency sledge ready to swing at the cerelum windows, either ignorant of the fact, or forgetting, that beyond those transparent metal panes was universal vacuum.

Throughout the vessel doctors and nurses worked with superhuman endurance. They wheeled the most exhausted patients to a special oxygenized room. Justin rendered them air in every way he could; dividing his time between the controls and the helpless. Sylvia worked ceaselessly, making it her special duty to keep Justin in shape. Upon him depended everything.

Days passed, days written off, not by dark and light, but the slow orbit of hands around the chronometers. The last of the oxygen was doled into the ship. A few hours later the vessel was hideous with short, quick breathing. Crew and passengers became more pinched, gaunt eyed and haggard. From cabin to control room, the doomed ship was harrowing to see; and earth was still a million miles away.

"It's unjust!" Sylvia cried over and over. "All you've done! All you've risked! For nothing at all."

Justin stared at the far away earth. Was man, after all, but a toy of Fate? Had he no control whatever over the events of his life? He had done all that human ingenuity could devise. The crew had carried on valiantly. Yet despotic vacuum was victor.

He remembered the old story of the Black Hole at Calcutta. A roomful of British soldiers suffocated because one small window could not supply enough oxygen to sustain life. Here there was not even that, just a dead unfreshened residue in the gigantic hull.

He remembered a rat he had seen under a glass dome when the air was pumped from it. The rat ran madly around its cage, clawing in panic at the glass that held it prisoner, panting until its pulse throbbed visibly along its throat.

Men recognized the futility of clawing at walls and racing around the ship. That consumed more of the precious oxygen. Only those driven mad did that. Most of them dropped lifelessly, breathing in that rapid, hideous way. The crew lay quiet, doing no work except that of relief. Meals were out of the question. Even thirst was a minor ill in such a crisis.

Justin's jaws set until their muscles ached. He had made a good fight, but the odds were beyond him. Watching those gasping souls aboard he wanted to break the windows and get the thing done. Space was the great king here and he had outstayed his passport. Space knew no mercy, granted no reprieves. Patiently it waited. A million eyes watched unblinkingly. The stars, Justin had thought so beautiful, were cunning, certain, and harrowing.

Back in the control room he found a new anxiety. Sylvia had crumpled. Stolings, too, was down. doubled in a sitting posture in one corner of the room. His eyes were bloodshot, his chest sunken and knotted. He was gasping and choking like a rabid dog.

Justin ran to the girl. He lifted her with something dread and terrible and hopeless in his heart. She was limp. Unless he did something at once she was gone. He let her down to the floor again. He stared wretchedly. He must get her help, and there was none. He was too weak to carry her down into the oxygen rooms, even if he was sure there was any oxygen left in those rooms. There was no one on whom he could call for help, not even Stolings nor the doctors. Every man, by then, was having his own fight with death, gasping for a breath of the air which God had seen fit to anchor only to minute spheres flung infinitely apart in the vast vacuum of death.

● Yet he had to do something. Sylvia was dying. His bloodshot eyes searched aimlessly.

"Good God!" he panted, "Good God!"

He stooped over the girl. She was so pale, so limp. He felt his own brain reeling, the pound of his heart was echoing in his head. His lungs were swelling, tearing, bursting in his chest.

It was then he remembered the air suit. Desperately he got it down and brought it to her. Somehow he managed to get her into it and open the oxygen valve. Then he staggered back to the controls.

Earth was a big moon. It was inflating so rapidly he wondered if that too was a crazy freak of his bewildered brain. No, it was the velocity of his ship. Something had to be done. The ship would burst into incandescent fire if she hit the atmosphere at this rate.

He swung the sun screen partly open. Then he staggered back to where Sylvia lay. She was breathing visibly, but still unconscious. He turned his wretched eyes upon Stolings. He managed to get to him, breathing so loud he was sure one could hear him in the cabins beyond the control room.

Stolings was still alive, but almost gone. He opened the oxygen tank of the other air suit under his gasping mouth. Stolings drank the life-giving air frantically, clawing for the suit like mad. But Justin could not let him keep the flow of oxygen. It was the code of space men. Passengers first. He could not save the mate at the expense of those below, even though he knew it was but a drop in a flame. He took the oxygen tanks from the space suits and opened their meager supply to the salon.

From outside the vessel came a whisper of sound which rose into a wail. It sent Justin staggering back to the

(Concluded on Page 731)

THE MOON DOOM

By NATHANIEL SALISBURY

● "High tide!" someone shouted.

Wilfred Hartley gulped, as with the thousands of others gathered on the Staten Island hill, he watched the long tidal wave thunder across the flats below.

There was a long sigh through the crowd as the steaming, watery wall crushed hundreds of houses in its path. It moved onward, unresisted, until with a crash of spray, that reached upward to the crowd, the wave beat futilely against the wooded hillside.

With hissing and gurgling, the swirl of greenish foam flew backward until it met a second wave. And so on, endlessly, each wave rolling higher, the limitless ocean beat tirelessly against the shore.

With the disappearance of the village below, and its scattering into splintered piles of wooden walls, Hartley turned away through the crowd. All that he had owned in the world lay scattered on the sea now. With the exception of the clothing on his back, and the few dollars in his pocket, he was at the mercy of the world.

Pushing his way through the crowd watching curiously the ceaseless beating of the rising waters, Hartley reached the Shore Road. Looking upward he shook his fist at the inflated, pockmarked nearly full moon, hanging menacingly in the afternoon sky. Twice its normal size, it revealed starkly its craters and dried seas. Unashamed it proclaimed itself a dead world.

"You think you've won," Hartley said aloud, oblivious of the curious glances of the onlookers. "Well, our turn is coming."

A hand touched his coat. "Easy, Hartley," a soft voice said. "Don't give way yet."

Hartley turned swiftly at the voice. It was Brent, the banker, owner of the big estate on the hill above them; the man who had sold him the house and land now submerged by the green limitless seas.

Hartley's face darkened and he pushed away the banker's hand.

"Get away from me," he growled. "Don't you see what's happened?"

"Yes, it's too bad," the banker grunted sympathetically. "But," he raised his hands helplessly, "Who could have . . . ?"

Hartley shook his fist in the man's face. He did not notice the crowd collecting and the policeman edging slowly toward him.

"Didn't I warn you," he shouted. "Didn't I tell you that the moon was approaching the earth and that we must build a wall to protect our coast? Didn't I plead with the state, the government to begin work at once?

"Didn't I?" he yelled. Brent affrighted nodded to the nearing officer.

Hartley turned to the listening crowd. He pointed to Brent. "This man and his kind are responsible.

AN "UNFINISHED" STORY

We present to our readers on these pages the beginning of what we hope will be the most novel and exciting contest ever started in any magazine.

On the following pages is the first installment of a story by Mr. Salisbury. We want you, our readers, to continue this story month by month, until it is finished. The following are the rules and conditions.

1. In this issue is the first installment of a story to run for four issues. (The February, March, April and May, 1933.)

2. The second, third and fourth installments are to be written by our readers.

3. You are invited to write the second installment of this story which will appear in the March issue carrying on the adventures of Hartley and Witherspoon and the development of the "Moon Doom."

4. The second installment must be between 3,000 and 4,000 words.

5. For the best second installment which we will publish in the March issue we will pay ¾ cent per word, upon publication.

6. Everyone, whether he has contributed or not to our pages, who is not an employee or a member of the family of an employee of the Stellar Publishing Company, is eligible to join this contest.

7. The judges will be the editors of Wonder Stories, and their decision will be final.

8. The stories will be judged upon the following basis:

a. They must be reasonable, plausible, and written as closely as possible in the style of the first installment, so that one would believe that they were all written by the same person.

b. The best stories are those in which the adventures of our heroes, the course of the story, the science used are original, refreshing and exciting. We do not want impossible rays, machines, or gadgets.

c. The earth is admittedly in a bad plight. What will happen, what can be done to save it? You are asked to develop that as cleverly as possible in the second installment.

d. The installment must end at a crisis, or at some point at which the narrative can be picked up in the third installment.

e. Because of the shortness of time we must insist that all entries into the contest of the March installment be in our hands not later than January 9.

9. No stories will be returned unless full postage is included, and a definite request is made for their return.

I warned them a *week* ago. But the bankers said I was crazy. And even if I might be right, it would be too expensive, it would raise taxes," he laughed. "Do you hear. It would raise taxes. They said, 'let's wait and see what happens.' Now you see." He swung on Brent. "Do you see what's happened? Are you satisfied?"

A strong hand grasped his arm. "Cut it out."

Hartley turned in the officer's grasp. A murmur of sympathy for him came from the crowd.

"What'ye trying to do?" the officer snarled. "Wanta be locked up?"

Brent put up his hand. "It's all right, officer. This man is just a trifle excited."

"Excited am I?" shouted Hartley. "Well . . . "

But he could not finish. The officer pulled him along, up the shore road until a bend in the road hid them from the crowd.

The officer released him. His attitude softened. "Now get along, son, and don't be kickin' up a disturbance. I know it's tough."

Hartley grunted. "Thanks. I guess I'll be off." He turned abruptly and continued up the road leading to the city.

A stream of madly rushing cars, with horns honking flew furiously by him, all city bound. Each was loaded with choice household possessions, hastily packed against the approaching sea.

From the larger estates that lined the road came loaded vans, with sweating drivers furiously trying to make their way through the endless stream of passenger cars.

It was a scene of confusion and haste, of a precipitate flight from the onrushing sea. At this time barely twenty feet separated the hillside and road from the water level. And hour by hour the waves were leaping higher.

As Hartley marched determinedly toward the city, he wondered as to the future. If the government, the people, had been so careless about the tragedy that had already occurred, what if it should become more threatening.

He had done his part. From the night ten days ago, when observing the skies through his homemade six-inch reflector, he had seen a great jagged body hurtling toward the moon's orbit, he had not rested. From the direction of its approach, he had recognized the invader as one of the larger asteroids, Ceres or Pallas. Quickly calculating the path of the asteroid he had concluded with a gasp that a collision with the moon was inevitable. Somehow torn from its orbit about the sun, the 300-mile wide asteroid was plunging wildly through space!

Rechecking his figures furiously, and convinced of their accuracy, Hartley had immediately wired the Princeton and Harvard Observatories and returned to his telescope to await the collision.

It was not long in coming. Though but a fifth the diameter of the moon, the onrushing body was cutting toward its path with a high speed, perhaps five miles a second. What would happen?

The crash came several nights later. Like the collision of toy worlds, the two bodies met soundlessly in space. Through the telescope the tensed watcher saw a silent explosion, and the cracking of the asteroid into millions of pieces that went flying madly through the heavens.

The moon had rocked crazily; and it seemed for a time as though it had stopped dead in space. But then slowly it moved, but with an altered path. What Hartley had not predicted had happened; the asteroid had knocked the moon from its orbit!

● Meanwhile telegrams had come to Hartley from the observatories confirming his observations, but cautioning him against divulging his information. And late that night, he had been visited by a quiet mysterious man, who flashed a badge of the United States secret service.

Informing Hartley of his knowledge of the facts in question, the visitor stated that a press release from the observatories would be sent out mentioning the crash of a "meteor" on the moon. That would satisfy the public, for after all the asteroid viewed by the naked eye did not appear menacing.

It was expected, the visitor added, that Hartley would confirm that to anyone who approached him. The man then quietly departed.

That, in brief, had been the events up to a week ago.

But from that time they had moved swiftly. Hartley going to work immediately had calculated the probable effect of the crash upon the moon's orbit. His results alarming him, showed that the moon would be turned inward on its path about the earth, so that it would approach the earth at a speed of a thousand miles an hour. His figures showed that after a primary hesitation of several days it would circle the earth, ever closer, ever faster, until five days later it would either crash upon the earth or swing away under the superior pull of the sun.

Realizing at once that a conspiracy of silence had been put upon the impending tragedy, Hartley had sent his new conclusions to the observatories, sent them in full to the metropolitan papers, and presented a demand upon the state of New York and the Federal government for immediate action. For, as he stated, if he were right, tidal waves were certain to occur with terrible severity, as the moon neared the earth.

It was evident from the excited reception that the public gave his statement, that the observatories had been alarmed. Public conferences were hurriedly held, to which prominent astronomers had been invited.

Their opinion was that although the moon *might* approach the earth, or the pull of the sun *might* restore it to its former orbit, days would be necessary to tell what orbit the moon would finally assume.

Meanwhile, the astronomers decided, it was up to the public bodies to determine whether the plans of engineers, that great walls be hurriedly constructed about the large coast cities should be begun. The cost would be enormous, all available labor must be thrown into the work; and perhaps it would turn out to be unnecessary.

It was the financiers who turned the tide against the action. By one means or another they delayed a final decision. Hartley knew they were playing for time, waiting first to see what "the moon would do."

And meanwhile an affrighted populace watched the heavens, as the moon wobbled eccentrically through the skies, trying under the combined pull of the sun and earth, to assume a stable orbit.

But too late they discovered that the moon had acted first. After two days of indecision, it had yielded to the superior pull of the earth, and for the first time its approach to Terra was decisive. But already the thundering tides had plunged upon the low-lying Staten Island shore. Struggling in three feet of water to extricate his beautiful

(Concluded on page 732)

(Illustration by Paul)

Straight at us it flew with appalling speed. The shock was terrific and we were thrown to our knees.

THE WRECK OF THE ASTEROID

by Laurence Manning

CHAPTER VIII

Another Disaster

● The next morning I was awakened by a shout from Mason.

"Look down there, everybody," he cried. "Leaves on all the trees! The flood has stopped and the water has almost disappeared overnight."

And a surprising sight it was. Every branch had become clothed with vivid green and the valley that had been one vast sheet of water was now showing brown earth to the sun in all directions. The watercourses were still brimming over, but the rest of the valley was rapidly drying.

Haworth set us instantly to our tasks. I was to explore for a starchy root or vegetable and also to cut several loads of "thread-tree" branches. Any spare time I had was to be devoted to keeping my eyes open for nuts or food of any kind which might be used as supplies to keep us going while the main work was under way. Jack was deputed to cut timber and prepare for moving the camp down into the valley once again. Mason and Haworth set off without announcing their destination. They went northward and carried knives and blankets with them. We all bade Teddy a good morning and set off in good cheer. I have often noticed that same thing, there's nothing like an object and aim in life to keep people happy and cheerful.

My curiosity drove me to locate first of all the deep pool I had seen from the mountain two days ago. This was less than a mile away, according to my sketch, and in fact proved even less distant. I soon arrived at the edge of the trees, which were so clothed in leaves as to be difficult to see through and still damp enough to make muddy walking. There was an opening before me several hundred feet across and I found myself gazing into a sunken dell, circular and with sloping sides. The banks were steep and slimy and enclosed a deep pool of water. At the edge of the pool I could observe some rocks and I made my way carefully down to examine them. They were of a uniform size and quite evidently formed the top layer of a wall that enclosed the water before me. Here was no handicap of Nature, but a *well*—created by the same intelligence, perhaps, that had hewn the caves in the mountain-top! I tasted the water and found it sweet and pure and I rejoiced that the problem of a water-supply had been finally solved for us. If we had only chanced upon this spot on our first landing, I thought!

I stood there musing a moment upon these further traces of a vanished civilization and suddenly felt a curious impression that someone was watching me. It was a genuine feeling; the hairs at the back of my neck bristled slightly and the flesh shivered along my back-bone. I turned about quickly and stared up that smooth slope to the edge of the woods above. A row of a dozen faces peered down at me! I caught my breath sharply and had

● A new crisis faces the Martian explorers. It must be met quickly. Either the men must be able to repair their ship to ascend to Phobos within a few weeks, or face the terrible hardships of a Martian winter.

In the background of this drama are two new factors. The first is the astounding discovery of the Martian inscriptions. Did an intelligent life really exist on Mars? Does it still exist? Will it emerge to prove friendly or hostile?

Secondly, with the coming of the spring will arise a new menace perhaps more deadly than any other, that must be met and courageously faced.

In this final installment of Mr. Manning's unusual story, these threads of drama will come to a smashing climax.

WHAT HAS GONE BEFORE

Haworth, Mason and Bigelow, after returning to earth from their exploration of Venus (The Voyage of the Asteroid—Summer 1932 Wonder Stories Quarterly) decide to explore Mars. They add to their number Bill Perkins, Haworth's mechanic; Teddy Colquist, explorer and athlete; and Jack Craig, a young chemist.

They land upon Phobos, moon of Mars and leaving Perkins with the ship proper, the others descend to the surface of Mars in a smaller rocket ship. Due to the fact that Colquist had jumped off the surface of Phobos and could not get back, the trip from Phobos to Mars has to be started suddenly, and without proper planning. Colquist is rescued in space but the small ship crashes on Mars where Colquist suffers a broken leg. The ship has to be abandoned and the crew has to descend quickly the mountain top on which they have landed to a deep valley where the air will be dense enough to support life.

They manage to establish communication by light flashes with the large ship on Phobos, but Perkins cannot help them. Mars is a dry arid place, and since their water supply gives out quickly they are faced with death by thirst. They start out to explore the land to find some water.

Bigelow accidentally discovers water inside a form of Martian cactus, in time to save the expedition from perishing. But the next day they are deluged by a flood of water from the melting ice caps!

Climbing to the top of a nearby mountain, they discover a flight of steps leading into an artificial cave of great antiquity. On the walls they are astounded to see a series of carved inscriptions, giving definite evidence of intelligent life having existed on Mars in the remote past.

Haworth, meanwhile, insists that the *Planetoid* must be repaired quickly. Else the men shall be forced to spend the winter on Mars, totally unprepared to face its extreme rigors.

reached for my revolver before I realized that they were our friends, the chickenpork. Then I laughed aloud and climbed up at them, making threatening sounds and gestures, whereupon they vanished.

I had a blanket over my shoulder in which to carry anything I found by way of food. This I now determined to fill, for the woods about the well were mostly Mars acorn bushes. An hour's picking and I tied the four corners together with food enough on my back for a week's supply for the whole camp. Teddy was glad to see me and had set about cracking the shells before I left again. This time I made straight for the group of thread-trees on the other side of Mount Craig and it was not until supper time that I returned with a huge pile of tendril-like branches on my shoulder and trailing forty feet or more behind me like a huge whisk broom, sweeping the earth smooth in my rear.

Mason and Haworth had returned loaded with the skins of two water-bottles each, which Haworth immediately set about cutting into large wedge-shaped sections, while Mason busied himself fashioning pieces of wood to certain mysterious specifications which Haworth called out to him from time to time. Jack turned up in time for supper to announce that he had enough wood cut to keep us in fires the rest of the summer! Also he had found the very spot for our new camp, he said.

"Do you know what I found? A *well*—full of water! It's walled in with stones and it's right at the foot of this mountain! Must be the deep pool you saw the other morning from the mountain-top, Dr. Bigelow."

I had been saving my news for a sort of surprise, but now explained my own discovery of the same well and we were all quite excited about these further indications of "human" occupancy of our valley.

"There were dozens of chickenpork all about," added Jack. I started slightly at the coincidence and puzzled a moment over it. Then I reflected that during most of the year this well must provide these animals with their only source of water. Of course they would remain near it.

There followed many busy days for all of us. I cannot attempt to describe in detail all the happenings, due to the very fact that they *were* busy days. When one has no pressing tasks then there is time for reverie and adventures and exciting discoveries. But once you outline a course of action and set a time limit upon its completion and immediately everything else is stifled by the press of little unimportant detail which fills the working hours.

Yet there are some things we should have noticed which at the time made barely any impression upon us. The very morning after the leaves came we noticed a faint buzzing everywhere throughout the woods and by noon it was quite loud. Insects—or things like insects (I don't believe they quite fall within that classification in its scientific meaning, although the average housewife would not notice the differences)—were to be seen flying and crawling in all directions.

Not one of them seemed to be pests. There were no mosquito-like or wasp-like creatures among them. We rather enjoyed their cheery murmur; it gave the countryside a more familiar and homelike sound. I should have liked nothing better than the opportunity to make notes and studies but was entirely without leisure, for I had still to find a starchy vegetable suitable for fermentation in the production of alcohol.

I found this on the third day of my search. All along the edges of the watercourse had sprung up quantities of small green leaves of a ragged, much convoluted appearance. I had noticed them and was interested because they seemed to burst from the ground with astonishing rapidity. One morning on setting off upon my search I was surprised to see them eighteen inches in height and very vigorous. Out of idle curiosity I pulled one up to find a fleshy root the size of my fist upon the end of it. I cut this open and I must say that it made a very fair Martian imitation of our earthly yam in general appearance. Pulling several more, I proceeded to the new camp, where Jack had by now moved our entire belongings, and asked him to test it for starch. This was apparently a very simple test and in a few minutes Jack started up from his chemicals in great glee.

"Perfect!" he exclaimed. "This is the very stuff! Is there plenty of it?"

● So that problem was easily solved, after all. Jack had found his clay, for the sides of the hollow surrounding the well were found to be almost entirely composed of this substance and Haworth now set the two of us to digging several great shallow holes in the soft earth in our clearing which we lined with this clay and hardened it by building bonfires inside. We then took blankets and filled them with Mars yam roots and made a huge pile alongside our new clay "fermenting vats."

Jack was in charge here and I helped him to mash the soft succulent roots with rocks on a flat stone and throw the pulp into the vats, which we had filled half full of water. It was a labor of eight hours to crush enough roots and it took half the pile we had collected. Then Jack sat there and chewed a few roots, dropping them half-masticated into the mess.

When I asked him why he did this he explained: "Ferment yeasts may or may not be present in this unearthly atmosphere. They are almost always present in the human mouth and body, however. All we need is one yeast spore to start things going. Give it the right conditions and it will fill a continent in a month, unless checked."

So I chewed a few roots and found them quite unappetizing, although Teddy experimented with some later and found that when baked in embers they were quite possible as food—no flavor, perhaps, but a nice mealy texture and nutritious.

By this time Haworth and Mason had completed their first "auxiliary lung." It was a strange looking apparatus and had nothing to recommend it except that they had taken it up the now dry cascade beyond the zone of breathable air and found that it worked. It consisted of a large bellows of water-bottle skin rubbery and strong. This was supported on the shoulders of the wearer by a piece of wood, formed like a collar, and was made rigid by being fastened to the belt with two wooden uprights. The bellows was worked by the actual drawing in of the wearer's breath: A wide band of copper was fastened about the chest and held together by a springy length of wood lashed into place with wire. Drawing one's breath, of course, stretched the spring which afterwards upon exhalation drew the copper band tightly back into place. The movement of the end of the copper band was transferred by stout wooden levers to the bellows, so that a

slight movement of the hand caused a large contraction of the bellows. From the bellows a tubing of rubbery skin led to the nose and was held in place there by a cloth helmet, in which were openings for eyes and ears. I put one on and really, for so makeshift a device, it was remarkably light—not over ten pounds. But of course, it would have weighed thirty pounds on earth. It was a very disconcerting sensation to breathe in and feel partially compressed air being driven up one's nostrils.

"It's quite a useless invention except for the exact conditions we shall face," explained Haworth. "Given air too thin to breathe, but not much too thin, then this auxiliary lung or whatever you wish to call it will make that air dense enough to support human life."

So passed the first week, by which time the mess in the vats had begun to bubble and yeasty odors to escape from it. Jack was greatly relieved, for apparently he had not been any too sure fermentation was possible on Mars. Haworth had already started work on his distilling apparatus —a large pot of clay, under which he had made a long, low fire-box and over which he planned to fit a conical cover of baked clay, ending in a spout of copper tubing. Later on we built our fermenting vats so that the distilling cover could fit right over them, with a fire beneath.

"There is no need to make a cooled receptacle for the alcohol," he said. "I shall run the copper tubing directly into the fuel containers of the *Planetoid* when we get her down here. They will be cool enough, because we shall have started her oxygen refrigerator to work liquefying air before we do anything else."

These were happy, if arduous, times. In ten days we were ready to start bringing down our rocket tender from the valley floor far above. We had filled our three fermenting vats with mash—one was nearly all through "working"—and we had assembled a large supply of food and fuel. Teddy was by now beginning to walk but I could not conscientiously allow him to accompany us on our expedition, for though his leg was set and the edges of the bone joining nicely, yet the mend was too new to support any hard strain. Besides we needed someone to remain and watch the fermenting process and continue to gather Mars yams.

"We will need just about 900 gallons of alcohol," said Haworth. "How many do you figure to get from each brew, Jack?"

"Pretty close to a hundred, Mr. Haworth. Those are big vats—there must be over 800 gallons of mash in each."

"And it takes about a week to brew, eh? Well, that means three brews—three weeks. That's about all the time we have, isn't it? You'd better work on two more vats if you have any spare time, Teddy. We'll probably be ready in time without them, for the distilling won't take long, but there's nothing like being sure."

Teddy had just finished weaving a six-ply length of rope from the thread-tree shoots I had brought. We took three hundred feet of it with us—a heavy load for one man, (Jack as it happened)—and set off just at sunrise one fine morning carrying our "auxiliary lungs" with us and enough food for several days. We followed the bank of the watercourse, now only three-quarters full of water, and found the scenery almost unrecognizable with the trees and shrubs in full leaf. It was a two-mile walk to the bottom of the dry cascade and we made this distance in half an hour, stepping briskly. There were insects everywhere, much larger than they had been when they first appeared. Flies almost an inch long were common and once we saw a tree covered with six-inch worms.

The three-mile ascent of the cascade occupied two hours and halfway up we all paused for breath. Mason pulled out a package of cigarettes.

"Teddy advised me to take these along and smoke them when the air started thinning out. He said it was an old trick with alpine climbers."

● Cigarettes were a treat for any or no reason. We puffed away in great contentment and found our breathing very much less labored thereafter. Why this should be I do not know, but that it is a fact has (I have since learned) been substantiated by many authorities.

Presently, however, as we climbed, it became necessary to don our breathing apparatus and the extra compression of the air gave instant relief to our aching lungs. I may here say that the only fault was that the extra labor forced on one's lungs by these contrivances, resulted in sharp pains in one's chest after a few hours use. We finally reached the lip of the upper valley and there stretched before us the dense vegetation through which we had come just after the wreck.

It was now close to ten in the morning. We found the old watercourse impractical for travelling in, since it was choked with vines and plants, and it was easier to go straight through the woods on slightly higher ground where the soil was sandy and less obstructed. An hour's walk brought us to our landmark—the open clearing of desert sand in which our ship had fallen, as we all distinctly recollected. Before our amazed eyes stretched the clearing—entirely and sickeningly innocent of anything in the least resembling a rocket ship.

The *Planetoid* was gone!

We covered that ground—every foot of it—but no trace or sign of the vanished vessel could we find. The sand had been swept smooth and clean by the flood. We found the place where our rocket had lain, for half a dozen trees at one side of the clearing had been snapped off at the ground and a slight but unmistakable hollow still remained in the soil. I cannot write of our emotions at that moment. It is like a nightmare in my memory and the details have faded. Nothing remains now but the sense of disaster and the "gone" sensation at the pit of my stomach.

Haworth paced up and down endlessly, his beard clutched in both fists and his head bowed down over his chest. Mason and Jack had flung themselves on the land and lay hopelessly, without motion. I wandered along the edge of the trees, staring at them with unwholesome interest, for, I kept saying to myself, here we are on Mars for the rest of our lives. I must know every leaf and every insect that can be of possible help in our coming struggle for existence. I suppose half an hour had elapsed in this despair when Haworth called us over to him.

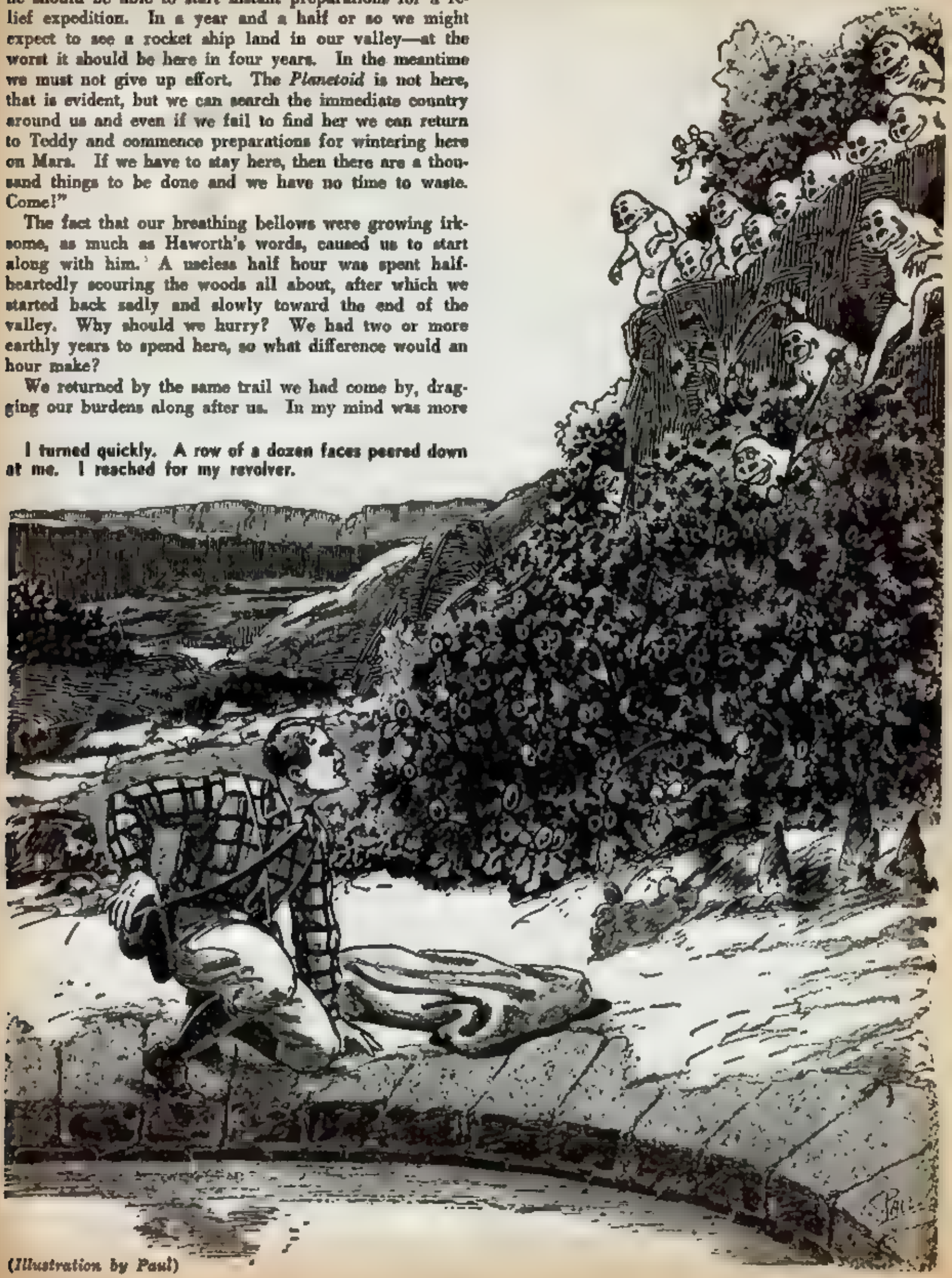
"Men," he said, and his voice was different somehow, as if the life had gone out of it, "Men . . . we are up against it. If we cannot find the *Planetoid* we cannot return to earth. But even so—were things ten times worse—there is always hope for a resourceful man. We

can at least signal Bill to return to the earth. There he should be able to start instant preparations for a relief expedition. In a year and a half or so we might expect to see a rocket ship land in our valley—at the worst it should be here in four years. In the meantime we must not give up effort. The *Planetoid* is not here, that is evident, but we can search the immediate country around us and even if we fail to find her we can return to Teddy and commence preparations for wintering here on Mars. If we have to stay here, then there are a thousand things to be done and we have no time to waste. Come!"

The fact that our breathing bellows were growing irksome, as much as Haworth's words, caused us to start along with him. A useless half hour was spent half-heartedly scouring the woods all about, after which we started back sadly and slowly toward the end of the valley. Why should we hurry? We had two or more earthly years to spend here, so what difference would an hour make?

We returned by the same trail we had come by, dragging our burdens along after us. In my mind was more than mere disappointment. I kept wondering what force

I turned quickly. A row of a dozen faces peered down at me. I reached for my revolver.



(*Illustration by Paul*)

had moved our heavy *Planetoid* and spirited it out of sight. Some huge creature, perhaps, or an exploring party of savage beings? Were they intelligent or had the rape of our ship been a mere jack-daw whim? Whatever it had been, it was certain something that could live in the rare atmosphere up here and I kept looking about me with misgiving and made sure every two minutes that my revolver was safely in its place in my belt.

Not half an hour had passed when we were all startled by a darkening of the sky. Looking up we saw, a mile above us, a great brown cloud passing overhead at enormous speed, swirling and eddying like a snow-storm. We were not far from the enclosing precipice at the time and when sharp pieces of sand began to fall on our upturned faces we instinctively ran for the partial shelter this cliff afforded. The sand was falling more thickly every instant and eddying strongly along the wall to which we clung for protection.

"Work along this way," shouted Haworth. "We may find a cave or an overhanging rock!"

The air was now filled with a fury of sound—a whistling and screaming of the wind and the deadly whisper of falling sand, which got in our eyes and mouths and, worst of all, into our breathing bellows. We were half choked when we came upon an overhanging portion of the cliff which, as if by miracle, gave us instant protection and Haworth unhitched our bellows, one by one, and shook the sand out without it being necessary for the life-saving apparatus to be disconnected more than half a minute.

"Close thing!"

"It must be a merry sort of Hell up on the surface in that sandstorm!"

While we speculated upon it, the storm passed as quickly as it had appeared. The sun shone out serenely again and the wind was stilled. We set off once more on our homeward journey and soon reached the top of the cascade. Far below us we could clearly tell where the camp was located by the thin column of smoke ascending high into the air, though the tent and its occupant were hidden by a screen of intervening trees. Sadly I thought of our hopeless return to Teddy and the death of all our eager plans. I looked around for the last time at this upper valley and noticed in the dry watercourse a huge boulder that struck me as vaguely unusual in some way. Then I remembered. It obstructed a small channel that we had used to reach the cliffs on our right, the day of the wreck. It had not been where it now was, that was certain. The spring flood had evidently carried it here, I supposed, though it was very heavy. And then an idea struck me like a sudden blow:

"What idiots we all are! The *Planetoid* would float!"

Haworth looked up in amazement. "She was badly cracked, but she *would* float for a time. Of course! The flood lifted her from where she lay! Quick, everyone, back along the watercourse until we find her!"

And a mighty changed group of men we were in that brief interval: From the depths of despair to the pinnacle of hope! Nothing had happened to change our physical circumstances. One difference only—a thought. A "mere idea", as the men of action scornfully put it.

CHAPTER IX

The Growing Menace

● We came upon the *Planetoid* around the first bend. She had driven up on a shelving rock and stuck there, twenty feet above our heads. Mason gave a great cheer and then had to sit down and recover his breath, for he had overestimated the strength of his lungs to do double work with the bellows. We got beneath her, two at each end, and lifted her gently and staggered down to the ground with her. My load felt about like lifting a very heavy man and was not at all beyond my powers, though Mason was not built for such labor and was on the sand recovering his breath again. The awkward projection of the bellows from our shoulders made it almost impossible for us to carry the ship, however. We made a rope fast to the bolts in her bow and dragged her around the bend and to the lip of the cascade.

"We'll leave her here for the night," said Haworth. "We're done in, all of us, and we'll go halfway down the slope until we can breathe some real air without this abomination on our noses. Tomorrow we'll get the *Planetoid* down into the lower valley, and that will be a whole day ahead of schedule, thanks to the flood!"

It wasn't such a heavy job after all, the next day. Our three hundred feet of cable enabled us to lower the ship from above, with one man below to keep her sliding clear. At the end of the rope, the ship was firmly braced against any convenient projection and we carried the other end of the rope down to her and repeated the lowering operation. By mid-afternoon we were on the sand of the desert on the valley bottom. We pushed the *Planetoid* into the still water of the channel and towed her briskly through the water by a line from the bank. In the late afternoon we hauled her out again and dragged her overland the half mile which separated us from the camp.

There were five vats where we had left only three and a great pile of Mars yams. But what was this? At our approach a veritable swarm of chickenpork rushed up over the lip of the first vat and raced off across the clearing, squealing and bounding and rolling end over end—one or two of them running on their hind legs! The tent had been placed against the side of a rock and in a semicircle in front of it there burned a great string of fires.

Much mystified, we called for Teddy and he appeared, kicking some of the blazing sticks aside as he passed through the guarding circle. He gave a shout of joy and surprise when his eyes fell on the *Planetoid*.

"That's quick work!" he said.

"What has been happening here?"

"Oh, did you see the chickenpork?" And he explained that shortly after our departure a few of the little animals had approached the camp and sat, noses in air, refusing to be frightened away. He had not bothered with them, continuing his labors on the two new vats. By evening, he said, there were hundreds of them and he had become a little nervous and had collected all moveables behind a circle of fires for the night. The next morning the one fully fermented vat was surrounded by the animals and he drove them away with a shot or two from his revolver. When he returned with a load of Mars yams there they were again and he chased them once more. But on his

third return he found them back again and more determined than ever. He could not frighten them away.

"It may have been the alcohol that supplied them with courage," said Teddy, "but certainly they were brave enough. Fifty or so of the beasts faced me in a solid army and advanced right into the fire of my gun. That called my bluff and I retired at once to protect the tent, although they have never come near here, I must say. I think they're just naturally fond of our yam beer and you should see them when they get liquored up! They do everything but turn handsprings."

Tired as he was, Haworth would not stop until he had made a thorough inspection of the *Planetoid* and he and Jack and Teddy disappeared inside her and remained there for an hour, while Mason and I prepared supper.

"How badly is she damaged?" asked Mason upon sitting down to our meal.

"Two cracks in the hull and a bad dent. The cracks run right through the fuel containers, which all need mending, but the oxygen liquefying pumps were scarcely touched—just some bent plunger-rods and a loosened base plate."

"We can fix everything easily with a welding torch," said Jack.

"A day's work for two men, once we have a torch rigged," confirmed Haworth. "And that will be simple, for we can burn liquid air and alcohol in it."

The evening was too warm for a fire and we lay outside the tent in the sunset, looking with some amusement at the chickenpork who had massed at the edge of the woods and were eyeing us and your yam mash with what I took for unappeasable thirst. As dusk came on they approached closer and closer until they were not fifty feet away. At Haworth's suggestion we shot half a dozen for food, but without driving the others more than a few feet back. We were just going to walk over and pick up our kills when an unexplainable thing happened.

A great gray winged thing fluttered softly down upon them and rose with one of the animals squealing and struggling in its grasp. Up and up it flew and disappeared behind some trees. We glanced at the ground where the hundreds of chickenpork had been a few seconds before. Every one had vanished, except the six still forms we had killed with our revolvers.

"What in Heaven's name!" I was standing by now and enormously alarmed. "That thing was an *insect!*"

Mason laughed. "Come, come, Bigelow! An insect three feet long!"

● I had a night of bad dreams and was glad enough to rise at the first sign of dawn. I made the rounds of the camp and was disturbed to notice that all the leaves in sight were becoming ragged and many trees were entirely denuded of green. Insects were everywhere, but none came near me. Then I came upon a caterpillar as big around as my wrist and twelve inches long! Apparently the insects had been doing a little growing while we were away in the upper valley! I picked up a stick and prodded it whereupon it reared its fore-end in the air and turned slowly from side to side, champing with curious three-sided jaws in evident anger. I let it touch the stick and to my horror it bit clean through the inch-thick wood with one single effortless motion!

I started back involuntarily and stood eyeing it as it continued its feeding. Was this thing a real caterpillar in the sense that it would pupate and come out as a winged insect? The flying creature last night had, I was sure, been some kind of moth. On earth we have moths of all sizes and habits. Here on Mars the first moth we had seen was apparently nearly three feet long. And before me was a caterpillar that might turn into something much larger.

I thought of the stone engraving of a great winged insect I had copied from the walls of the mountain-top cavern and continued my walk with an inward shudder. I saw four more large caterpillars of the same kind and almost stepped on a fifth, crawling along the ground. It was nearly two feet in length and at least six inches through. Suppose these things kept growing another two weeks before they pupated! We would have moths bigger than a man!

I went down to the well, twenty feet through the woods from our clearing, to fetch water for breakfast and was surprised to see the entire clay bank punctured with holes eight inches to a foot in diameter. The black flaring snouts of chickenpork protruding from almost every hole revealed the whole story instantly. But why had they suddenly taken to a subterranean existence? And then I saw my first chrysalis. It was three feet long and greying white, built on two parallel branches of a tree. I walked over toward it and spied another one through the woods fifty feet further on.

Everything was plain to me by now. I was practically certain that the huge moths were carnivorous and that the chickenpork protected themselves by underground burrowings. The disturbing thought was this: Some caterpillars were larger than others and they kept growing right up to the time they pupated. The longer they waited, the larger they became. If the current crop of moths was three feet across, how large might those be who were to emerge from the chrysalis two or three weeks from now?

I filled my "pot" (the copper helmet of a space-suit) with water and found the mouths of the little tunnels formed excellent steps down the slippery clay bank, the out-thrust snouts vanishing at the approach of my feet. On my return to camp everyone was awake and stirring and Teddy had a breakfast fire going and a chickenpork on to roast.

"Hah there, Bigelow! How are the insects this morning?" called Mason.

I told him carefully what I had seen and he was almost converted by my words, which process I completed by dragging him over to the edge of the trees and finding him a caterpillar fifteen inches in length. He eyed it in silence and turned away with a little gesture of distaste.

"We have close to three weeks left," said Haworth after our meal. "That should be time enough if we work hard, but there must be no mistakes. Jack and I will repair the vessel and attach the distilling tubes to the fuel container and, with Mason's help, get the air liquefying pumps to working again. That means for Bigelow and Teddy the entire care of the fermenting vats, collecting enough yam roots and food to keep the camp going. It will be hard work for only a few days. After that the five of us will have little to do except keep things run-

ning smoothly, and waiting for the fueling to be completed."

And so it proved, although it was five days before Haworth finally agreed to let well enough alone and call the repairs "completed'." Their blow torch was ingeniously rigged out of two space-helmets and some copper tubing. The refrigerator pumps were started on power furnished by the first distillings of alcohol—which turned out tolerably crude fuel, but it burned readily enough. Then the liquid air was put in one helmet and alcohol in the other and put under pressure from an air bellows which drove the fuel up its tube to meet the stream of vaporized air from the other helmet.

The mixture was completed in a steel nozzle which had come out of Haworth's box of mechanical odds and ends. The heat developed was terrific and quickly fused the metal to which it was applied. A most careful job was done in the fuel and oxygen tanks and Haworth finally assured us that the mended places were, if anything, stronger than they had been before the wreck. He was inordinately proud of his blow-torch.

"Of course it's dangerous," he conceded, "but only if somebody makes a mistake—which won't occur!"

Three vats were by now completely fermented and waiting to be distilled; and our liquid air was already forming in the oxygen tanks of the ship. We all turned to and soon had both processes functioning automatically. We had had no time during these busy days for observing the insects and on the afternoon of the sixth day since our return we left Jack in charge of operations the four of us going for a tour of observation along the base of the mountain.

We passed by one side of the well and kept hidden and quiet as we passed, hoping to see something of our friends the chickenpork. We saw two or three of them wandering aimlessly over the ground and half a dozen were at the water's edge drinking. (I saw one which scooped up water with two fore-paws and drank like a human!) Out of almost every hole protruded their soft black muzzles. It was a peaceful and interesting scene, but as we looked the aspect changed suddenly. There was a quick desperate scurrying and the clay bank was empty in a flash. A moth at least four feet from wing-tip to wing-tip fluttered silently down over the hollow. It was curiously marked with white on black wings, somewhat suggestive of a bat though it had none of the latter's dexterity in flight. The body was cylindrical and covered with black velvety fur.

● Just then two smaller "moths", as I shall call them, came floating over the well and one, catching sight of us perhaps, flew close overhead and Mason struck at it with a branch he had picked up from the ground. All three hovered around us awhile as we proceeded through the woods, which only partially restricted their flying—so nearly bare had the trees been stripped by the voracious insect life all about us. In half an hour the walk proved so unpleasant that we turned about and started back to camp. I had noticed and called my companion's attention to the thing which finally proved too much for our peace of mind. It was a chrysalis near the top of a tree. The dirty white sheet measured five feet in length! In all directions were to be seen similar shroud-like cocoons of various sizes and in many different positions, and on the way back I spied several caterpillars that had not even yet begun to pupate. They were the size of monsters in nightmares—as big around as a man's thigh, and as long.

I was walking in the rear and about halfway home I felt something pull at my hair. I brushed at it with my hand and felt four rope-like tendrils grasp at my hand as I did so. With a shout of horror I leaped forward and looked up at a huge black and white moth hovering over my head. I pulled out my revolver and pumped six bullets into its body but did not even cause it to pause in its flight. My memory went back to the prolonged macabre flutterings of an earthly insect pinned to a specimen board and I realised that my bullets were less than pin-holes to this enormous creature. I ran frantically and met my three companions hurrying back with sticks. A well-directed blow from Teddy sent the thing fluttering off in a hurry, convulsively wriggling its injured legs and body.

We made all speed back to camp and found that Jack had been attacked by a large moth during our absence. He had knocked it into the fire—or close to it, for the heat had killed it without burning any of its body. As a result I had a perfect specimen for taking back to earth with me and I carefully stowed it in the little cabin of the *Planetoid*. One wing-tip was scorched a little, that was all.

That evening I urged Haworth to stow the tent and all our equipment back in the cabin and make our home inside the ship while we awaited the completion of fueling. I pointed out to him the danger that each day's hatchings of moths might be of larger size than the last and that the time would certain come when we might expect to be attacked by an insect so tremendous that we would be unable to defend ourselves.

"I think you exaggerate, Bigelow. But you've been right twice now about the moths and perhaps you will be right once more. Anyway, we'll do as you suggest for I had intended to move into the ship as soon as we could, anyway. She's more comfortable to live in than the tent. But I hope we'll be out of this valley forever before those six-foot cocoons of yours hatch!"

"We had better be," I replied warningly, "and I think we should build two more vats tomorrow and get our last batch of mash laid in the same day."

"But we have two weeks before we must leave."

"*Must* leave—because of the orbits of Mars and Earth, you mean?"

"Yes, of course."

"We may have to leave for other reasons, Hawor'h!"

He tugged at his black beard, all unkempt from a month's neglect, and stared unseeingly at his feet, swaying back and forth as he thought. "We'll get busy tomorrow and do all the gathering of supplies at once—might as well get it over with. Is that what you want?"

I nodded. Heaven send that we were not already too late!

The next day all five of us in a body proceeded to the clay slope surrounding the well and dug out great clots of the red stuff. We tried to avoid ruining the chickenpork burrows as much as possible, but had to open one and a pair of the animals scrambled out and streaked away to the next hole. At the bottom we found a young one very much frightened and I determined to keep it to take back with us to earth, for it was too good an opportunity to miss. So I stuffed him gently into a pocket

where he snuggled down as quiet as death. We did not get quite enough clay on our first trip, but it was a mere ten minutes' walk and we returned once again. This time I took along a space-helmet and filled it with water and tried to get Haworth to order all our vessel's water tanks filled then and there, but he refused.

It was still before noon when we passed through the woods and arrived at the edge of the watercourse with five blankets and started pulling up Mars yam roots. The water level was now only halfway up the sides of the channel. Haworth pointed out that the water would probably be entirely evaporated before summer was half over. Jack was interested in the cause of such a rapid disappearance, which we finally decided was due as much to the porous nature of the soil as to the hot drying atmosphere.

The first load of yams was dug and transported without incident. Moths were to be seen occasionally but none came near us We dumped our garnerings in a great pile and returned for more, after a hasty lunch. On the way back, happening to come to a part of the watercourse where some "spear-apples" grew, I broke off a branch apiece. Mason laughed at my fears and hailed my "fly-swatters" with great glee. But I felt much more comfortable in my mind to have one beside me as I worked and insisted that each man take his spear back with him—though I persuaded them only after much grumbling, for we had loaded ourselves heavily with roots to avoid the necessity of a third trip.

We started back through the woods and were almost to the ship when the sun was darkened and we stopped and glanced overhead. A dozen of the largest moths we had seen were floating and flapping with uncanny silence just ten feet overhead and as we looked they whirled about and came at us!

"Drop your bundles and keep together!" cried Haworth and we stood back to back and presented five broad-bladed wooden spears to the aerial enemy. It was an impregnable defense. They fluttered and flapped around, trying to settle down on us, but a slight movement of a spear point was enough to start them off again. One five-foot brute plunged down on Teddy's weapon and almost succeeded in breaking through, for he was surprisingly heavy. However, Teddy recovered his balance and thrust upward at the same instant, tearing a great gash in the velvet body and sending his attacker circling dizzily off out of sight.

But the others remained and more were coming every few minutes. We were safe so long as we stood there, but helpless once we moved—particularly if we should try to load ourselves down with our bags of roots. What were we to do? Fortunately we did not have to answer that question. They all floated off and away as erratically and unpredictably as they had arrived and we stared around us a minute before we ventured to resume our burdens.

"I take it all back, Bigelow," said Mason earnestly. "If you hadn't insisted on our taking along these spears .... well, you saved our lives, that's all!"

"Did you notice that the largest moth was only five feet across?" I asked. "When those six-foot cocoons hatch out you'll see moths twelve feet, perhaps, from wing to wing. And it might be better if we were not in this valley at that time."

CHAPTER X

An Astounding Discovery!

● I had been observing carefully the woods about us as we trudged along and was surprised to notice that the gradations in size among the chrysalises were not uniform, but step-like. Beyond the common three-foot sizes, there were practically none except the great six-foot shrouds. Would these super-moths be of an entirely different nature? Perhaps not moths at all—but something quite different? If so, we had better be doubly on guard. I reflected that it was only two days since I had observed the first of these enormous cocoons and estimated that we had at least a week before we might expect the emergence of their imposing occupants.

But it was with a shudder that I saw on a large tree twenty yards to my right, just at the edge of our camp clearing, a caterpillar at work weaving his gray sheet. He was almost finished as we came upon him and was half hidden, but the length of his structure was more than seven feet and much thicker than any we had yet seen. I pointed him out to Jack as we passed.

"What a pleasant little paradise, as you put it the other day, this valley is going to be during the summer!"

Jack shuddered and went along without answering.

The afternoon was half gone by now, but Haworth gave us no rest. He did not need to urge us very much, for our new fears were as spurs behind us, and we set about preparing the mash for the two new vats, which Jack and Haworth were shaping up. By dark the yams were sliced and the baking-fires blazing in the new clay-walled excavations. The three original vats had been exhausted of alcohol and we threw out the remaining mess with our spear-like shovels and refilled them, using the last of our water to dilute the mixture to the proper consistency. Then we retired within the *Planetoid* and to bed in our hanging cots.

The next day was a repetition of alarms and excursions. We made three trips *en masse* to the well and got enough water to fill the two last vats and a little over for our tanks. Then we worked over the mash under Jack's directions and soon had the satisfaction of knowing that here in the clearing beside our rocket-tender were all the materials we needed to enable us to complete her fueling. We were attacked twice, but only half-heartedly and by single insects which we easily drove away—killing one with a lucky thrust of a spear through what would be its thorax if my anatomy be correct.

It was necessary for us to tend to our distillery occasionally, and beyond that there was nothing to do. But, I reflected, in another week we shall have to start moving the distilling cone over to the final vats. That would mean exposure to any danger there might be at that time—and the great cocoon showed grey at the edge of our clearing like a monstrous threat. When would its awful dweller emerge? Too soon, perhaps? Even ten minutes too soon might be fatal for our plans.

We spent the following morning (at my final insistence) fetching sufficient water from the well to fill the drinking tanks of the *Planetoid* and I collected also a full blanket-load of nuts for my pet chickenpork. He had proved very difficult to feed until I had tried him with these Mars acorns, which he devoured with great avidity, after the

(*Illustration by Paul*)

There stretched before our eyes the dried and wrinkled body of an unimaginable creature.

manner of a squirrel. I kept him in one of the cupboards in the cabin which had been emptied of its supplies. Here I had placed some soft cloth and a pan of water and he seemed to be thriving.

We were entirely unmolested that morning, but at lunch time we were driven inside the cabin by half a dozen of the flapping ghost-like things who approached too close for our comfort. They might possibly not have attacked us had we remained outside, but none of us was sufficiently curious to find out!

The next three days were spent in luxurious idleness and the fourth day thereafter saw the last of the old vats ready to distill, which process we started by moving over the large clay cone to cover one of them and by digging beneath it a shallow fire box to heat the fermented mash. We had found, due no doubt to the lessened gravity and much lower air pressure, that liquids boiled at very low temperatures indeed, so that not much of a fire was required to start the alcohol evaporating.

We had not been attacked now for several days and wondered why, for moths were often to be seen fluttering about over the tree tops in the distance.

"Perhaps," suggested Mason jocularly, "they have come to the conclusion that we are not edible." Whatever the cause, we were thankful for the fact. We kept ourselves close by the *Planetoid* and Haworth had built a screen of small branches woven together with which we could cover the air-lock and still have fresh air in the cabin.

One thing I badly wanted was another chance to finish my copying of the inscriptions on the walls of at least the first room in the caverns at the top of Mount Craig. Without question the fact that Mars had once been inhabited by civilised beings was the great bit of discovery we had made and it was woefully incomplete as things stood—with fifty feet copied out of one hundred and sixty in one room alone. I felt if we could finish that single chamber I should have a complete message or picture to work on. There would be ever so much more chance of our eventually reading some meaning into the symbols. I pointed out these facts to my companions that evening.

"Now, while we are apparently immune to their attacks, we have a chance we will never have again. It would take three hours to go up and come down and if Jack and Mason would help me copy an hour should be enough up there. One morning of our time—that's all I ask. I realize there's a certain amount of risk involved, but I feel it is our duty to take this risk. The reward may be greater than we think."

● To my surprise everyone consented and the next morning we rose early, set the distilling cone over a fresh vat, for the old one was completely exhausted of alcohol, and set off with spears over our shoulders. The woods were half dark in the dawn light and the air cooler than it would be later in the day. We marched briskly up the mountain, arriving without incident of any kind. We had brought electric torches with us and we flashed these on as we descended the ancient stone stairway. Teddy and Haworth remained outside studying the valley below them with binoculars from the *Planetoid's* lockers. The remaining three of us set to work on our copying, keeping careful note of where we started on the wall and where we stopped and the series number of our sheet, so that the final work could be pieced together as a whole later on.

We finished within the promised hour and with a few minutes to spare. Now that we had electric flashlights with us we made a most minute search through the three chambers but found nothing but dust everywhere. It was almost ankle deep, lying even on the projecting surfaces of the carving along the walls. Weird streaked effects were produced, for the stone was blackish and the dust yellow-gray. Into every corner I felt with my fingers under the dust and finally did find one thing—a piece of sheet gold. I found this in the partially ruined chamber to the north, near the passageway, buried under the loose, soft carpet of dust. It was so thin that it almost fell apart in my hands and on it have since been traced markings which indicate it had been carved or written upon at one time. But so ancient was it that this almost imperishable metal, gold, had lost evidently nine-tenths of its original thickness—and by the sheer attrition of *time*.

I had started back up the rock staircase with a sigh of regret that there was not a solid month of leisure available for a proper search here when it suddenly occurred to me that we had not examined in back of the stairs themselves. I turned with my flashlight and proceeded to do so.

"Mason," I called, "come here!"

"Found something?"

"Here's a sort of second staircase starting down from the rear of this one."

The entrance was a crude arch cut in the stone and all three of us proceeded to descend to new depths, our hearts beating with excitement. This flight was somewhat longer than the upper one: I counted thirty-four steps to a landing and seventeen from the landing down still further. We flashed our lights upon a sepulchre carved into the living heart of the mountain. The purpose of the low vaulted room was at once apparent, for about us in niches set in the wall were upwards of forty still forms buried in the dust of ages.

A quietude possessed this chamber—a stillness and calm that seemed to have vital living power. We all felt it and the speech died in our throats and left us voiceless. Imagination staggered and reeled beneath the effort of realizing how incredibly long ago these dead beings had hewn out this stone tomb. Constellations that no longer shone in the sky were then overhead and the earth, no doubt, was a steamy, misty marsh such as is Venus today. There was an other-worldness about the place that made us *feel* its age—antiquity has a *smell* that cannot be mistaken.

With immense awe I approached the nearest of the recumbent figures. It was smoothed out shapeless by the dust of millennia. I reached out my hand to touch it and felt something hard beneath the three inch accumulation. Carefully I brushed and blew away the dust and found a leaden winding sheet. The metal was cracked in innumerable directions and the cracks showed minute white powder. With my knife I set about removing the covering and found it came away with very little resistance and as I worked carefully there was absolutely no damage done to whatever might be beneath. Patiently I labored, hardly daring to breathe, and Mason and Jack looked on fascinated.

There stretched before our eyes the dried and wrinkled body of an unimaginable creature. It was about five feet in length and at first I thought its face had decayed, but upon more careful scrutiny I determined that those broad flaring cavities had been his nostrils and that it never had possessed ears. Strong capable hands with four finger-like tentacles that looked pliable and jointless lay at his side at the end of short, stout arms. In many ways it was quite suggestive of a human, but only suggestive—like a piece of clay molded by a savage in gross and swollen proportions.

My sweeping operations had filled the air with dust and some of this lodged in my nose. I withstood the tickling sensation as long as I could but suddenly I lost control and sneezed violently. As if by magic the form beneath my gaze fell away to white powder. Not even the bones remained solid. I had a startled, superstitious feeling that this body had remained shapely as if to fill a pressing need for me to view it. My imagination pictured the dead thing lying there throughout the ages yearning for dissolution but denied the boon until I had come and seen. Then, the restraint of duty removed—pouff!

I would have opened another of the lead-shrouded corpses but felt such an unaccountable reluctance for the task that I refrained. Still silent, the three of us flashed our lights around the chamber. It was small—about thirty feet across—and one of the five walls was blank. At the foot of this wall we observed some bones in a mound of white dust and with great curiosity set about examining them. They seemed to be from several kinds of bodies—all similar but with marked variations. They were evidently the remains of much smaller animals than the beings who lay about us sleeping in the stone niches.

"Why," I exclaimed in a surprised whisper, "I believe these are the bones of chickenpork!"

And so they were, although at the bottom of the pile we came upon some bones larger than those at the top. They were vaguely different and if they were also chickenpork remains then they were considerably larger than any we had seen on Mars. But their likeness to the smaller bones at the top of the pile was too significant to leave room for any other theory.

"Perhaps these are the remains of the funeral feast," suggested Jack.

I shook my head. "Where then are the feasters?"

"And besides," added Mason, "If the bodies in their leaden cases should crumble to powder, why should the bones piled in this open corner of the tomb be still firm? There has been an interval of thousands—perhaps hundreds of thousands of years between the two deposits, for in this deep cave and in the dry air of Mars it must take enormously long periods of time for such a complete decay as we saw."

Our awe was giving way to curiosity and as we became more accustomed to our surroundings we commenced speaking once more in natural tones.

"That pile of loose bones," I said, "shows a great variation in the progress of decay. At the very bottom is nothing but dust—*white* dust, remember. Then come crumbly remains, some of which fell apart in our hands, as you saw. Only at the very top are the bones at all firm, and even these are evidently ancient for their lightness bespeaks their extreme dessication and no particle of skin or gristle remains upon them."

"But how do you account for their being here at all, then?"

"Well, they evidently were placed here one by one over an enormous lapse of time. Did something bring them here? If so, why? Or did these chickenpork come here to die of their own free will, or obeying instinct, perhaps? We can suppose anything we like, but the answer remains inscrutable. It will never be solved, in all probability . . . Incidentally, speaking of long periods of time, we have been here quite a while ourselves. Haworth and Teddy will be wondering what has become of ■■"

And I looked for the last time upon this burial vault of a forgotten race as we ascended to the sun and air above.

Haworth insisted that we start right down again toward camp without delay. It was eleven o'clock and I pointed out that Phobos would be coming into view in another hour, but he shook his head impatiently.

"There are thousands of moths all over the valley," he said worriedly, "and we saw one of the very large cocoons away off toward the west in a tree . . . and there was some movement about it. We couldn't tell if it were an insect emerging or possibly a caterpillar just finishing its chrysalis."

You may be sure we wasted no time in getting down the mountain end, hurried as we were, we kept a good watch for trouble overhead, but none came. I placed my notes with a sigh of relief in a locker inside the ship's cabin. There would be plenty of time to study them on the way back, I felt. We spent the afternoon checking over the alcohol tanks of the vessel and found to our joy that they were filling nicely. The refrigerator tanks were already full of liquid air and the pumps only going occasionally, keeping the contents automatically liquefied.

Haworth figured that we really would not need the last of the two newest vats, and in theory could get along without any more alcohol. But, as he pointed out, "the ship was designed for a special high-content fuel and pure oxygen. How well she will operate on crude underproof alcohol and liquid air, is a matter of some doubt. If half her tank capacity would be sufficient with pure fuel to make the return voyage back to Phobos, then we had better give her full tanks of our makeshift liquids if we expect her to make the same journey. To fill the tanks completely we will need to distill the contents of just one of the last two vats."

The remaining three days of waiting passed very quietly. We lived within two jumps of the rocket ship, for there was something ominous about the quiet—a sense of impending danger. The insects seemed affected by it and were seldom in sight and the wind passed dryly through the empty branches of the trees nearby, now innocent of the least greenery. Things like house-flies, but scarlet winged and with enlarged bullet-shaped heads, swarmed over our clearing. They were four inches long. We saw a moth attack one of the few remaining caterpillars and bear it away squirming high above the trees. As we watched, the moth's wings collapsed suddenly and it fell in two pieces, while the "victorious" caterpillar plumped down to an audible death below.

It was evidently a time of hunger in our valley and dog ate dog all about us. I feared that we would not long be immune and so it proved, for a determined attack by a swarm of the moth-like monsters took place out of a clear sky one evening and drove us inside the ship. The vestibule was a narrow one, as I have mentioned, and Jack's right arm was seized by two of the insects and almost torn off his shoulder, only a fortunate thrust Teddy made with a spear-apple branch saving him. The creatures clung to the screen over our air-lock for hours, two and three deep, and a loathsome sight we found them, so we closed the inner door and retired for the night.

In the morning they were still there!

CHAPTER XI

Besieged

"This may be serious! The last vats will be ready this morning for distilling. Suppose these moths stay here?"

But they didn't. About eleven o'clock something caused them to vanish—I thought they acted frightened—and after waiting a few minutes to make sure they were really gone I crawled outside very cautiously and looked around me. The coast was clear.

We all came out and started to work on the distilling apparatus when I happened to raise my eyes and saw the thing I had been dreading all these weeks past. The seven-foot cocoon was moving!

I called the alarm and we all started back, looking over our shoulders at it. It was quiet again now. The entire valley was deathly still in the hot sun. Then there came a ripping sound that we could hear clear across the clearing and up through the split cocoon was thrust a head. Slowly, ever so slowly, there was emerging a huge body.

"Hurry, everybody," I shouted, "we will probably have twenty minutes or more before he is clear! Get our outside work done while we have the chance!"

And we were quick about it, you may well believe. Three of us lifted the heavy clay cone over to the last vat we would need, while Haworth and Jack tested the tanks and checked over the alcohol feed line. Then we started the fire beneath the vat and stuffed plenty of wood into the flat fire-box. The fire did not draw properly and required further attention and fuel. I had been watching the insect

closely and observed that he was now entirely emerged. Then the great wings opened to the sun.

"Look out!" I warned frantically.

"I've got to put one more armful of wood in that fire," cried Teddy. "Have I time?"

"Hurry!"

The other three had spears in readiness and Jack handed me mine. We were not more than twenty jumps from the vessel, but we could not tell how fast this new monster might fly. Teddy was grunting and sweating away and had just started to crawl out and get on his feet again, when there leaped into the air the most awesome creature I had ever imagined. Seven feet from cruel head to polished tapering rear he stretched; and his gleaming, semi-transparent wings were tinted scarlet and were easily eight feet from tip to tip. There were two sets of them, one behind the other, and they moved with unbelievable rapidity and made a deep throbbing roar as he flew. Here was no floating, veering, vacillating moth, but a monster of direct purpose and tiger-like activity. Straight at us it flew with apalling speed!

I had hauled Teddy to his feet and Mason had handed him his spear in the same instant and the five of us started at a trot for the air-lock. We almost made it, but just as we came within five yards of our ship the sun was blotted out and great wings stirred a thunderous wind over our heads and our five raised spears met a weight of several hundred pounds in reckless attack. The shock was terrific and we were thrown to our knees beneath it. One thing alone saved us: The blow had been vertical and had met the spears end on, so that they were thrust down to strike the ground with their butts. The stout wood withstood the shock, not our muscles.

"Crouch low to the ground!" I cried, for I observed that this flying nightmare was thrusting a sharp sting out from its pointed abdomen. In fearful ferocity its body bent and twisted and fully two feet from its rear projected the poison rapier, searching and probing for our quailing flesh. Every detail of the beast was clearly exposed to my enforced study, for we could not move. There were three sections in its body, a little like an earthly hornet. The rear section was three feet long and about a foot in diameter; the center section in which was set the second pair of wings, was small and not more than a foot and a half in width; but the head was enormous—great bulging compound eyes a foot across and beneath these a powerful beak-like mouth set at the under side of the front section of its body, from which the forward pair of wings protruded.

Mason and Teddy emptied their automatics into the great body without the slightest apparent effect—twelve .32 calibre bullets! Still the massive jaws champed on air and the deadly rapier searched for us. I was nearest its tail and I tell you it was an uncomfortable position, for once it came within a half inch of one hand and I quickly lowered my grip on the spear to avoid it, the sweat pouring down my face. Had the spear slipped then . . . !

It seemed like centuries but could not in reality have been more than three minutes before the great "insect" leaped away from us and soared up into the air to a dizzy height. Then, before we could make a move, down it plunged again. We gasped in expectation, but it was not making for us this time. It aimed for the other side of the clearing where another of the super-cocoons showed gray among the branches. The tree bent and quivered beneath the shock and it proceeded to tear the huge cocoon into shreds and to devour its occupant with avidity.

We made the five yards to the *Planetoid* in a fraction of a second and covered our entry through the narrow air-lock with massed spears. Once inside, white-faced and trembling, we tore down the wooden screen and shut both outer and inner doors behind us with more relief than I can say.

"Pleasant chap!" grinned the irrepressible Mason. "A carnivorous, insectivorous, ferocious and atrocious cannibal—and in excellent health to judge from his appetite!"

We trained the periscope on it and found it finishing its meal. As we looked, a huge moth fluttered into view and with a savage leap our monster was on it and we could see, even at that distance, the great sting flash into its victim's body. The moth sagged at the touch and fell limply out of sight, closely followed by its assassin.

"Well," observed Teddy, "that's a good sign, anyway. If the thing is a 'Moth-hawk' it will help a lot, for this valley has too many moths for comfort."

"A dozen of those Moth-hawks will clean it up in a week, if their appetites stay with them."

● All that day we looked out from our safe cabin, steel-enclosed, and during the afternoon three more Moth-hawks were seen in the air and toward evening a flight of twenty moths came into view and were attacked by two Moth-hawks, as we watched breathlessly. The moths looked larger than their attackers, due to the great spread of wing, but in four minutes by my watch not a single moth of the twenty remained in the air. It had been a more savage scene than anything I have imagined before or since and fortunately my movie-camera was close to hand and the light was good. I was able to take a record of the last part of the slaughter. I have since studied the film many times and in my opinion there is no creature on the three planets capable of withstanding the attack of this flying Death.

Not even the great *Dinosaur tyrannus Rex* on Venus could avoid a thrust from the lightning-quick rapier and, the poison once in that huge reptile's blood, nothing could prevent its death. I found on my spear, where the sting's point had just missed my hand, a dent in the very wood itself filled with dark brown liquid—about a thimble-full. This Jack succeeded in analyzing and it proved to be an alkaloid of the utmost virulence. He wanted to try it on my pet chickenpork, "Mannikin", but I would not permit it.

As evening fell I could not help breathing a sigh of great relief to look around upon our home-like and worry-free group. "It's wonderful to think we are safe in this rocket-tender, merely waiting for the last tank to fill with alcohol from the vats outside."

Mason agreed heartily and stretched his long legs out from his camp seat comfortably and lazily. "Let 'em do what they like outside, eh? Unless there's some kind of a bug that can eat its way through steel we don't care what happens now."

"Incidentally," said Teddy, "We've seen Mars for the last time, do you realize that? From now on we will only be able to look at it through a telescope like ordinary folk."

Haworth glanced up from a book he had been read-

ing. "Oh, but there's one more job still undone, you know."

I gasped. "Outside?"

He nodded comfortably. "We have to seal the fuel tank when it is filled. There's no way of doing it from inside here, for it's just a screw-cap that fits over the tank vent. If we left it off, our fuel would pour out when we were under acceleration."

A moment before we had been comfortably speculating in a detached, impersonal fashion upon the horrors and dangers outside our protecting hull. His words placed a chill of reality upon such things.

"But good Lord, Haworth! With that Thing out there!"

"Oh, it shouldn't be much of a job. It is only ten feet from the air-lock along the side of the ship. Won't take a minute."

"In a minute one could be killed and eaten!"

"It doesn't have to be done until the last minute—how long now before the last schedule, Mason?"

"Six days is the utmost we can wait here."

"Well, in six days a lot can happen. If the worst comes to the worst we can all five of us go out with our spears and do the job . . . no, that might be bad, crowding one at a time through the narrow air-lock."

"I should say it might! Suppose two of the moth-hawks attacked at once? We five can hardly claim to have scored a victory over even one of the brutes—two would find us easy victims."

Haworth moved restlessly in his chair. "Of course, it could be done this minute, for the distilling process must be complete by now and the fire beneath the vat has no doubt died out. But I have a hunch these Moth-hawks will quiet down after a few days, the way the moths did. Anyway, it can't be helped. We'll have to wait and see."

I spent a worried night. It would, I felt, be just like fate to bring us safely through a hundred dangers and forsake us at the last one! The next morning we rose late. There was nothing particularly to be done and all the time in the world in which to do it. I spent the entire day at the periscope glass watching the events outside. During the morning we saw many moths attacked and killed and by afternoon not a thing was visible except an occasional Moth-hawk speeding across our range of sight. In the early afternoon we saw a fight between two of these predatory creatures. They came together with a fierce rush and beaks champed and stings stabbed in a dizzy fury of beating wings. Then one fell, bitten in half, and the victor started to swoop after it ferociously. But as it did so one wing fell fluttering from its body and it, too, fell behind the tree-tops, body bent double and sting stabbing its own thorax in unreasoning fury.

"Come!" exclaimed Teddy, "A few days of this sort of thing and the valley will be habitable!"

I agreed, for quite evidently these creatures would not only clear the country of other forms of life but, in the end, fall victims to their own voracity. I told Haworth that it looked as though his guess was a good one. "Five more days and we will have an excellent chance of slipping outside and returning unharmed."

We watched exultantly for more evidence to support these hopes but saw nothing moving the rest of that day. We slept in great comfort and peace of mind and lay late abed the next morning. Jack was the first one up and he roused us all by calling out to know who had taken his Moth-hawk poison.

"I left it in a little bottle last night right here on top of my box!"

None of us had noticed it, but we arose one by one and joined in a search for the deadly stuff. In answer to Teddy's question, Jack spurred us to further effort by replying that he did not remember whether he had a stopper for the bottle or not—he rather thought he had left it uncovered! But search where we would, there was no sign of it.

"It must be somewhere! Was anyone near here last night?"

"I believe I was," said Mason. "Last night I was clearing up after our supper. I had a pail of water on the floor just about there and washed the dishes with water taken from it. Then I poured the half-empty pail back into the tank!"

As he spoke I had glanced curiously at his hands, for he had been rubbing them together as though they itched him.

"Great guns, man, look at your hands!"

They were red and sore-looking and small pock-marks were beginning to show on the backs. Mason looked at them in surprise and alarm.

● Jack uttered an exclamation. "Hold them away from you, Dr. Mason! I believe I know what happened . . . wait a minute now!" And he opened our supply closet and brought out a can of lemon juice. This he opened into a bowl and brought it over to Mason, whom he insisted should wash his hands carefully in the sticky acid.

"I think," he explained, "that somehow the bottle of poison got knocked into the pail of water. Your hands show its effect, even when enormously diluted. The lemon juice should counteract its power, so far as your skin is concerned, but if I am right we must drink none of that water in the ship's tank."

Teddy immediately got a spear and probed around in the tank with it.

"Here it is!" he exclaimed after a few minutes. "I can feel it rolling around beneath this stick. That ends it!" and with a firm hand he opened the valve that would drain the tank out through a pipe to the outside of the ship. Jack had finished laving Mason's hands by now and examined his face carefully for signs of the poison.

"You may have scratched yourself during the night," he suggested.

I insisted that Mason strip himself naked and we sponged him off with lemon juice from head to heel, using up two more cans of the fluid to complete our precautions. After that I felt confident that no harm would be likely to come to him.

Human nature is a perverse thing. When we arose that morning we were none of us particularly thirsty. But now that we had no more water I felt a great desire for a drink. I licked my lips and looked around at my companions. I could tell that we were all thinking of the same thing. How long could we last out before thirst would force us to act? Or the *fear of thirst*. We had had such a recent and terrible experience of this nature only a few weeks ago that our imaginations had a wealth of facts and symptoms to dwell upon. In five minutes, and I am not exaggerating, my tongue felt swollen!

I walked over to the periscope glass and turned the

controls to search the sky. For a while nothing was in sight and then a huge Moth-hawk swooped into view and came straight for our ship. With a thud that could be heard throughout the vessel he struck us a resounding blow. Then in front of my revolted eyes his magnified image could be seen seeking for an entrance. He crawled out of sight along the side of the hull and we could hear him striking again and again with his deadly sting and scraping the cold metal with his massive jaws. After a while there was silence but for all we knew the ugly Nemesis was waiting just outside the air-lock ready to pounce on anyone venturing forth for even the briefest instant.

We sat in the cabin the rest of the morning and all the afternoon. Not a drop of liquid was there to drink except the concentrated essences in the ship's supplies—and we had tried that before! We scarcely spoke to each other but when we did the general trend of thought was all too apparent. Today, I was thinking, we will not suffer except mentally. Tomorrow we will sit here and slowly go crazy. And I made a secret determination that I would not wait for that dreaded torture to arrive. No matter what might lurk outside, it could not be worse than the distress we would find inside our steel-protected cabin.

Late in the afternoon two of the Moth-hawks attacked our *Planetoid* with a breathtaking fury that chilled our very marrow, even though we knew no harm could come to us from them. Jack had been sitting in great dejection and suddenly leaped to his feet, picked up the pail and started towards the air-lock. His face was wild with emotion and his eyes blood-shot.

"It's all my fault!" he cried hysterically. "If anything happens to you all I'm as good as a murderer! But I'll not cower here any longer. I'm going over to the well and bring back water. If the Moth-hawks kill me it's no more than I deserve!"

He jumped to the door and had it wrenched half open before we could get to him. Jack, as I have said, is a very strong man and although there were four of us we had our hands full. He seemed half insane and struck wildly at us and cursed and pleaded. We got him down on his back, though, and the door into the air-lock shut again. He lay there breathing in great, dry, heaving gasps. It took him half an hour to calm down and then Haworth took him to task.

"Your craziness almost lost me a member of my crew! I can't afford that loss. Whether you value your own life yourself has nothing to do with the case; your duty is to the expedition!

Jack nodded remorsefully.

"This is no time to lose your head. We must be very calm and careful. And how absurd your idea was! It is two hundred yards to the well. We can solve our problem by a ten-foot walk along the side of the hull. All we have to do at any time we wish is to slip outside, screw on the vent cap and start off for Phobos where we can help ourselves to the *Asteroid's* water-tanks."

"Let me go out and do it, then!"

"No. We will wait as long as we can and then, tomorrow or the next day, when we hope there will be fewer insects left alive in this valley than there are now, we will make the attempt. But *you* will not be chosen to do it. You are not cut out for that sort of work. These matters are decided on fitness—not on feelings."

Jack started to protest, but Teddy told him gruffly to "shut up!" and bundled him into his cot. All that evening the remaining four of us sat and eyed one another in almost complete silence. We were none of us suffering physically from water as yet—it was rather the fear of that torment which we knew so well. That was what preyed on our minds—plain fear. I could see the others lick their lips with dry tongues as though experimenting to see whether they were really cracked open yet, or only felt that way. When one of us spoke it was briefly and I more than half suspected that we were merely testing our voices, wondering when they would begin to croak hoarsely from our burning throats. We knew every symptom and sat there fearfully waiting for each to appear.

CHAPTER XII

The Return

● All that night I lay in bed quite sleepless. I am presenting these circumstances not as an excuse for what followed, but rather by way of explanation of my otherwise not understandable actions. Haworth's iron will could stand the temptation, perhaps, but he sadly overestimated my own staying powers. Now that it is all over I blame myself bitterly for my action—had I known or suspected the indirect result of it, I should have cheerfully shot my brains out rather than acted as I did.

But that is weak language, for I would much rather have shot my brains out than to have faced another twenty-four hours of parched torture. I have always been unable to understand the psychology of suicide, but I can see it clearly now. In a way I did much the same thing, so far as my mental process and motivation was concerned—mere chance turned the blow from my own shoulders.

All night I kept thinking to myself: "Just two minutes of quick action and our troubles are over! You have only to slip outside, Bigelow, screw down the cover of the tank and return again. Then we could start for Phobos and our water-supplies up there as soon as we wished. Why wait until thirst racks your body?" Then I would call to mind the terrible appearance of the Moth-hawks and shudder violently at the prospect of those two minutes outside the protecting steel walls. All night the battle went on inside me—one fear against the other. But when, about dawn, I felt the first symptoms of thirst as I had felt them before in this valley—when I knew from the pain in my lips that they had started to crack open and felt, from its size, that my tongue was badly swollen in my parched mouth—then I could resist no longer.

Stealthily I crept to the door and silently worked it open, closing it as quietly behind me. I was in the narrow air-lock and to get out-of-doors had to push the outer door slowly open before me. I looked upon the Martian sunrise. There was a slight swirling of mist among the bare branches of the trees and the sky was faintly tinged with orange. I held my spear in one hand and stood there peering out for several minutes. Nothing moved and not the slightest sound met my strained hearing except the beat of my own heart. I gulped in a lungful of the cool bracing air and, crouching low, slipped fearfully along the side of the hull to where the snake-like length of copper tubing entered the alcohol tank. Quickly as I worked,

it seemed to take an eternity to pull the end of the tubing away and find the metal cover that was lying on the ground beneath. Then, just as I started to reach down to pick it up I heard the drumming boom of a moth-hawk in flight.

I gave an involuntary cry, dropped the cover again and raced the three steps to the door and tumbled inside. I tried to pull the door shut behind me, and had half succeeded, when an irresistible force outside struck it and closed it upon me with a resounding clang and I bumped my head against the wall of the little vestibule. Half unconscious, I staggered through the inner door into the cabin, closing this shudderingly behind me. The whole thing happened so quickly that I was inside before Haworth had time to flick on the cabin lights. He stared at me from his cot in bewilderment.

I laughed embarrassedly.

"I failed," I said, and fell dizzily into a chair.

Haworth rose and stood over me. The others were awake now and listening. Haworth was very angry, as I could tell from his darkened face and the way his hair bristled in his black beard.

"I seem to be in command of a crew of lunatics! I bring along a chemist and a naturalist and one after the other they reach the conclusion that they know more about the proper conduct of an exploring party than I do. It never occurred to you—you're in this, too, Jack!—that you were both rather heavy clumsy fellows, did it? Of the five of us here you two are obviously the least adapted and trained for the physical feat that requires doing outside!"

Jack mumbled something about "his fault—why not his risk?"

"What has fault to do with it?" snorted Haworth. "This job must be done by those best equipped for it—just like any other job. So far as 'fault' goes, Mason here was the one who knocked the bottle of poison into the waterpail—but that act does not make him quick on his feet or resourceful in an emergency!"

"I couldn't help it, Haworth," I said weakly. "I can't face thirst again!"

"So that's it!" (he was furious now). "And do the rest of you feel the same way about it!"

"It has to be done, Mr. Haworth. Why wait until we are weakened by privation?" Thus our Teddy, whose active figure was half raised in his cot.

Haworth shot him a long shrewd stare.

"Well—go ahead then! For you are by all odds the best man for the job. This is the very kind of thing you were chosen for. If you, as well, can't face a little discomfort for the sake of greater surety, why should I continue this puerile scene?"

Teddy flushed brick red and bit his lips furiously, but all he answered was: "Very well, sir!"

Quietly he stood down on the floor and fastened on his boots. Methodically he put on his belt and made sure knife and revolver were both in place. Then he started for the door. Jack had thrown himself face down on his cot and his shoulders were shaking. Mason was pulling at his collar as though it choked him. Haworth walked over to the periscope glass.

"Wait a minute!" he said.

He peered long into the screen and turned the controls to cover every possible corner of our range of vision. Then he turned to Teddy and held out his hand.

"Nothing in sight, lad," he said. "Be ready to jump back at the first sign of danger . . . and good luck . . . I wish . . ."

But Teddy seized his hand quickly. "I won't be a minute, sir!" He turned to the rest of us. "See you later, everybody, when we'll laugh at all this fuss about nothing." He stood there, clean, eager and fit, with lean smiling face and gay eyes—I can shut my eyes and picture him this minute, dear old Teddy! Then he took his spear in his left hand, opened the door and shut it behind him, very softly and quietly. Mason turned off the whine of the air-conditioning apparatus, so that the cabin was in deathly stillness. I was staring at the hands of my watch and they moved so slowly I had to place it to my ear to reassure myself that they were moving at all.

"Five seconds," I said.

● Haworth licked his lips and cleared his throat. "Perhaps it would be better after all if we took our spears and stood in the doorway to guard his return. There's just one chance in a million that we might . . . I feel we *have* to do something to help!" All five of us reached that door in a bunch and wrenched it open. The outer door was ajar. Haworth herded us back and stood alone in the vestibule. He explained to us in a low mutter over his shoulder: "I was right at first. This space is too narrow for more than one. We would only hinder instead of helping. I'll stay here." And he held his spear in readiness and peered outside.

I glanced impatiently at my watch, feeling that Teddy must surely be through by now. The hands showed that twenty seconds had elapsed!

Suddenly Haworth started slightly, straining his ears. We could hear a faint scraping and realized that Teddy was now screwing down the cover. But Haworth was listening to something else, evidently. His voice startled us:

"Back for your life, Teddy!"

There was a droning hum growing louder with sickening rapidity. Then as we waited tensely for Teddy to appear, the sound became a very thunder and the outer door was knocked violently shut upon us by some heavy blow. Haworth was knocked back into our arms and before we recovered ourselves we heard a scuffling and thumping outside the hull. It was over in a few seconds and the zooming roar of flight broke out afresh, rapidly thinning out in the distance.

The other three seized spears and rushed for the door, but I leaped to the periscope and it was I (sad claim!) who had the last glimpse of the body of Theodore Colquist, first martyr of space, as the giant Moth-hawk bore its inert burden out of sight over the trees. My horrified exclamation stopped Jack from rushing forth in search of poor Teddy, for he thought there might be a chance of his having fallen nearby. I told him what I had seen as gently as I could and he, poor boy, broke down completely and sank into a chair.

"He had just finished closing the tank," said Haworth brokenly. "Two more seconds would have been enough to let him get back inside!"

"Damn them!" cried Jack, shaking his fist in the air. "If I ever get back to earth I'm coming to this valley with poison gas and flame-throwers and I won't leave one of the cursed things alive on the whole planet!" And he

went over to his cot and threw himself upon it, face buried in his arms.

There was nothing we could do for Teddy any more, now. We knew that. And even if there had been, there was no possibility of our getting outside without meeting the same fate ourselves, for two of the great Moth-hawks were soaring over our clearing and zooming savagely, low down above the vessel. With infinite sadness Haworth gave the order to prepare for our return to Phobos.

We could now leave in safety, thanks to Teddy's brave performance of duty, but this knowledge was bitter in our mouths. Very grimly we peered through the periscope glass at all we could see of our valley—a last look around. It seemed to me a very nightmare of horrors. I gazed mournfully out at the scene—bare branches and an occasional huge insect in the distance. We could not see the watercourses from our clearing and the landscape presented almost the same appearance it had upon our arrival. One exception only—the great insects.

"You know," I said to Haworth, "I wonder why we didn't find the valley littered with these great bodies—or at least with the bodies of the huge survivors of the cannibal contest?"

"Perhaps the chickenpork live on the remains through the winter."

"Not a bad idea! Well, we'll never know now. Time's up!" said Mason.

"Every man to his cot!"

Haworth applied the power and we all watched the instrument dials with anxious faces, but the make-shift fuel worked splendidly and in a few seconds the periscope glass showed only the darkening blue of the sky. Quickly it grew in blackness and stars commenced to shine. We were in space once more. Mason's rough calculations had been very little out of the way. Phobos was soon sighted and we assumed a diagonal course to meet her orbit. There was some quick juggling of power levers coming alongside of the little moon, for her mass was so small that we had to drift gently against her if we expected to avoid rebounding again into space. As it was, we landed half way around the tiny world from the *Asteroid* and Haworth refused to make the attempt to get any closer.

"Even with the slightest applications of power we might easily bounce off from Phobos and be unable to return," said he. "As it is, here we are safe enough. We have a nine mile walk before us, that's all. But it's two days before our scheduled start in the *Asteroid* and we have nothing heavy to carry. Even if we had, we could carry it on this tiny world. The whole *Planetoid* weighs less than ten pounds here!"

We had been compelled to ruin all but one of the space suits in adapting them to various unintended uses down on Mars. This one remaining suit Mason insisted upon wearing and he went out through the airlock in it, after having announced that he would carry us, ship and all, around the world! As a matter of fact, this is precisely what he did. The whole trip occupied less than two hours.

● We were watching through the periscope glass and observed his meeting with Bill. It was a grotesque sight, for both of the dancing maniacs were bulgingly encased in rubber space suits and copper helmets! Bill gave a hand with the *Planetoid* for the last mile and the two vessels, great *Asteroid* and little rocket-tender, were finally placed side by side. Extra space suits were brought in to us by Bill who stripped off his helmet as soon as the air lock was opened and entered the cabin with such simple joy and unaffected pleasure at seeing us again that we were all of us close to tears.

"And how did Teddy manage to get into this ship without my seeing him?" asked Bill. "When Dr. Bigelow and Jack came rushing back without him and you all started off so suddenly for Mars I stood staring in some surprise, you can well imagine. Then I set off to find Teddy, for I made sure he had been left here with me and I walked all around the moon . . . why what's the matter? Where *is* Teddy?"

And we told him our sad news. Bill was much affected and stood there with bowed head for a moment. "He was a brave lad," he said finally, "and he died a more unpleasant death than he might have wished for. But, as I understand it, he finished his duty first and saved the rest of you before he went. There's many a man has *prayed* for that kind of death! I only hope I'll find it when my time comes—to be able to close my eyes on a finished job!"

We were all of us silent a moment thinking of our dead companion.

"But Bill," I said finally, "it's mighty good to see you again! There are still five of us left, anyway! How does it feel to have human company again?"

"Oh Dr. Bigelow, you can't imagine how good it is to see you all! I was nearly out of my mind with the loneliness and uncertainty. Half a dozen times I sat in front of the controls in the *Asteroid* and could hardly resist taking the ship down in an attempt to join you in your valley. And just when it seemed forever and ever since I had seen you or had even been able to get an answer to my signals, why, here you are!"

"If you had gone down to Mars," said Haworth, "we should never have been able to leave it! Certainly not for years and years."

"Then thank God I resisted, sir. I had your orders to stay here, or I might have gone down. When the temptation came on I sat and said to myself: 'Bill, stick to your orders,' I'd say, 'and conserve the *Asteroid's* supplies and by all means remain on Phobos. Those are your orders, Bill.' And after I'd repeated my orders two or three times I'd feel calmer and go get in a space suit and sit outside to conserve the ship's atmosphere.

"But didn't you want to take the ship back home to the earth, Bill?"

Bill looked at Mason in amazement. "And leave you down there on Mars! . . . Oh, you're joking, eh?"

We moved everything of value over to the *Asteroid* without further delay and shut off all motors in the little *Planetoid* and sealed her tightly. Haworth suggested that if Jack and Bill wanted an occupation for the next day or so we had to remain on Phobos, they could move the *Planetoid* over to the pole of the tiny moon—three miles away. "Then you can wedge her into some slight hollow there and she will be protected forever from the sun's heat. She will freeze up, liquid air and all, in the absolute cold of space. Some day a rocket-ship may venture this way and find such few supplies as remain in her to be of the utmost value."

It was precisely the kind of adventure that the two needed to take their minds off poor Teddy and they left the

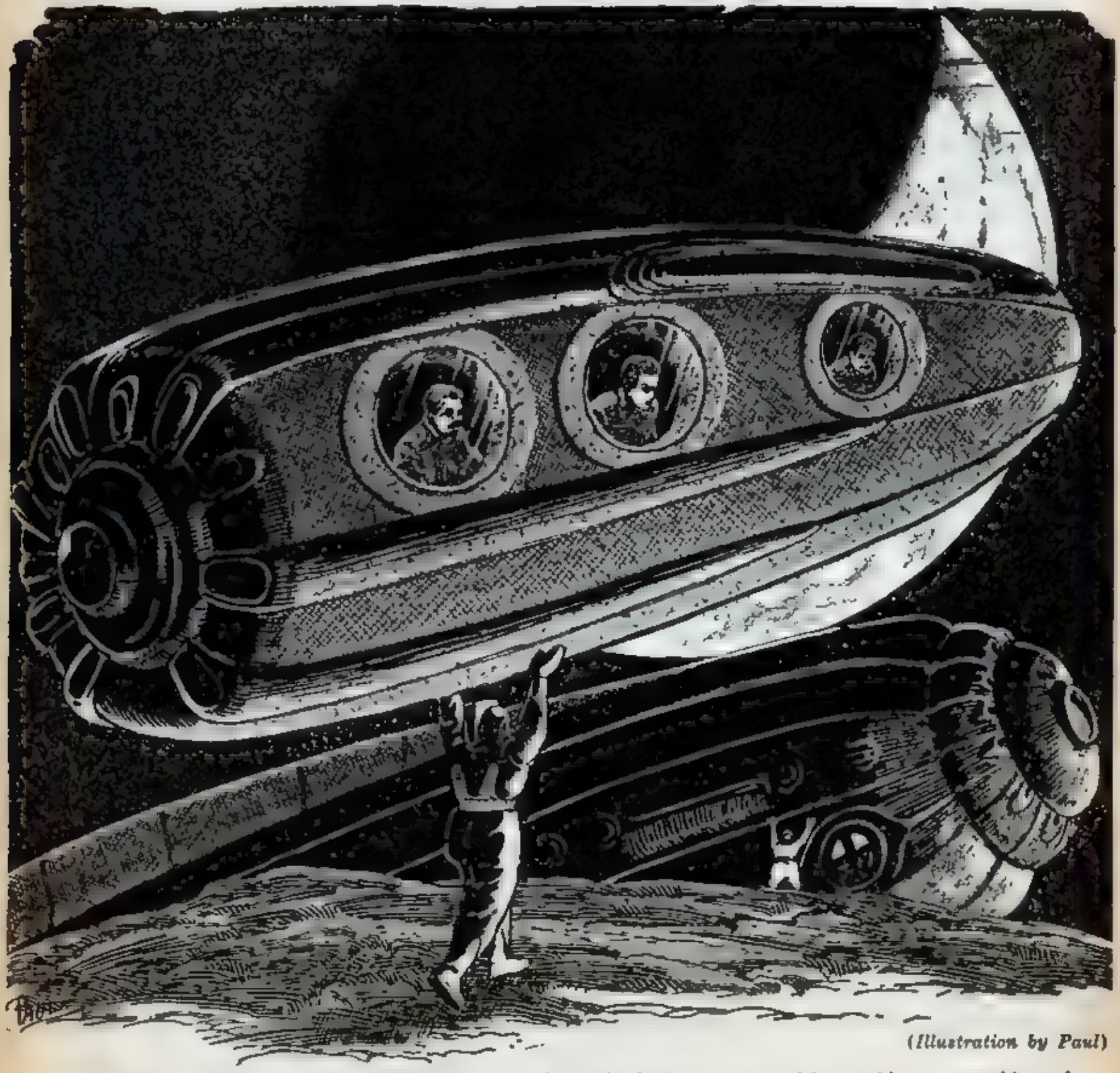
cabin eagerly, while the rest of us set about getting things to rights and luxuriating in the many comforts of these large and well-appointed cabins. How we should have laughed at such a eulogy of the *Asteroid's* living quarters a year ago!

I was vastly curious now to see what could be observed of the deep valley called Solis Lacus by earthly astronomers, for Phobos was to the south of the Martian equator and we had plenty of time for observation. I studied and photographed this deep valley or ocean bed, as it may once have been—several times as it swept across the periscope glass and observed what were, without doubt, some of the large moths flying in it. We also located three other smaller valleys which seemed to have motion of some kind and made up our minds that quite a respectable area of Mars may possibly be adaptable to human life.

"Suppose," said Jack, (he and Bill had returned) "a dozen communities in these valleys," his voice hardened grimly, "*All insects destroyed!* . . . Connection set up between the communities by small rocket ships operating on frequent schedules. Why is it not possible that Mars may be colonized in the next fifty years?"

Mason was busily checking our position every half hour and finally the moment came for departure. We climbed into our cots and Haworth pulled the starting levers. Three or four minutes of pressure followed and the roar of our rocket exhausts filled the cabin with reassuring thunder. Then he pulled the rotating lever, the sound ceased, our cots swung sideways, the walls became floors and we were homeward bound.

There is very little more to tell concerning our adventures. A day by day account of our monotonous voyage



(Illustration by Paul)

Bill gave a "hand" to the PLANETOID for the last mile, having announced he would carry us, ship and all, around the world!

would be inexpressibly dull reading. However, my study of the carvings from the caverns in Mount Craig resulted in some remarkable suggestions. The copied inscriptions had been pieced together into a continuous roll for careful study. Apparently they started on one side of the entrance to the chamber and ended on the other, after encircling the room. There was one symbol that occurred more frequently than any other and puzzled me very much. It was not a picture of anything, as I imagined it, but rather a hieroglyphic representation of some object. It is like a cylinder on pointed legs and is rounded top and bottom. Two diagonal lines run upward from the center of the cylinder to a sort of shoulder on each side and the portion of the surface at the top has a raised section of peculiar marking. I had been staring at this and racking my brains over it for several weeks when one time I happened to glance up and observe my pet chickenpork. I gave a gasp of surprise, for it appeared in a posture which almost exactly conformed to the drawing before me! Its two forepaws were the diagonal lines and the broad black snout and flaring nostrils quite closely approximated the shape of the puzzling mark at the top.

I said nothing to the others, for my thoughts were too vague and incomplete to be expressed in words. Could it be that the chickenpork were the descendants—the degraded and dwarfed descendants—of the ancient builders of Martian civilization? We are so accustomed to think of evolution in terms of gradual *improvement;* but of course it is a process which may just as readily change a race for the *worse.* My imagined history of the chickenpork race is not, perhaps, anything more than a mere theory, but it fits together. It makes sense.

Let us suppose, millions of years ago, the planet peopled by these beings. They are, first and foremost, great agriculturists for certainly our one little valley was planted with trees and shrubs of the utmost specialization. How many centuries had it taken to breed the spear-apple tree? Or the water-bottle? But why only trees and shrubs? For one reason, so that there would be the least possible labor in cultivating the crops. No spring plowing and sowing, and no cultivating with trees! The farming of grains and vegetables is, after all, a primitive form of agriculture.

It was the easiest way of growing food quickly and so appealed to the human world, with its constant visitations of armies and wars and pestilences. Slavishly we have followed the same hide-bound practice to this day, although we know very well that most, if not all, of our food requirements can be grown more easily and surely on trees. The Martians had evolved from grain-growing to tree-farming. And another thing while we are upon this subject, a grain crop means a steady robbing of the soil; a tree crop, if anything, adds to its richness.

This picture of the Martians as *tree* farmers gives us an introduction to an even more vital subject. There are no hills remaining on Mars' surface—or nearly none. It is just one vast sandy plain. Does it not suggest a world once farmed and tilled over every square foot of its surface? Slowly, as the centuries roll on, the soil is washed away from the bare, raw, ploughed, harrowed and tilled surface until the country lies flat and barren. Rain falls and there are no depressions in which it may collect as oceans or lakes. It is absorbed into the soil or quickly drawn up again into the atmosphere. How may this have affected living conditions on such a planet?

(Do not think my picture exaggerated: We can see the same thing going on today on our own earth! Vast areas of China and all too many acres even in our own "enlightened" United States bear mute witness to the folly of grain farming and "clearing" of land on a wholesale scale.)

● Then as Mars became flat and sandy and the water and air were no longer plentiful, they had, either by brute force of numbers or (more likely I think) with some amazing mechanical power, dug huge valleys tapping the frozen reservoirs of water at the poles. In these long valleys they had practiced the new agriculture—having been bitterly *taught their lesson*—and had bred and cultivated trees that would produce food and water and thread and nuts and fruits and, unquestionably, a thousand other products which we in our ignorance had not discovered.

I like to think of this phase of Martian life. It must have been very comfortable and quiet. There would be little to do except watch the trees grow and seek one's pleasure in the meantime, whether in science or art or wherever one's tastes lay. But then came the final doom in the steady, relentless lessening of air and water. The long winter must have been spent in chill quarters; the long droughts passed with far too little water for any but the bare necessities. And then the "harmless" insects—no doubt their scientists had warned them and had been duly ridiculed for it—the humble bee and the lowly ant and their ilk evolved new breeds and attained new stature and strength. Hopeless, facing final extinction anyway, the Martians may have let the insects get out of hand and their paradise had been turned into a living Hell.

I can see them down the ages, always pursued now and always hungry. The large ones being less easily hidden from their enemies and so more readily falling victims. A premium put upon cowardice and a penalty upon daring. Slowly the race descends to the brute and hardship and oppression stamp out the last spark of intelligence and reason.

The memory of the greatness of their race would persist for ages. At first the palace on Mount Craig would have been visited regularly by the "king" or "priest" or whatever ruler they may have had. Then the danger of going so far from the water supply and the steadily diminishing air pressure would have rendered this unsuitable for frequent habitation. The chosen few were buried in the sepulchre for thousands of years, however, until at the last it must have been a meaningless instinct, when the leader of the pack had died, to throw his body down on that heap of mouldering bones. But now even the instinct had been dead for a thousand years, probably.

And so the insects rule supreme. Would intelligence develop and lead some race of insect to the mastery of Mars? Was our valley an exact duplicate of other similar valleys? Had some hidden tribe of intelligent chickenpork succeeded in keeping out the insects and overcoming the onslaughts of physical nature—perhaps dwelling in peace and happiness to this very day? The answer to many questions will be awaited breathlessly by the world when the next exploring party starts for Mars. Then, too, there are my drawings to be deciphered and their

secret solved.

As I write these lines, I am daily expecting word from Jenks and Davis of the Royal Antiquary Society. They have had my sheets of drawings for the past two months and, since they are perhaps the best cryptologists alive today, I have high hopes that their work may prove fruitful.

You may imagine that I studied my little pet very closely after this idea came upon me. I named him *Martiana finis*—representing as he did the last, or at least the only animal life we had found. Mason suggested that he should be called a "Marsupial" and only laughed when I assured him the animal did not carry its young in pouches. The more I protested the more he laughed until it finally dawned upon me that he had been guilty of an atrocious pun. My pet name for the creature is "Mannikin" and he became very tame indeed and would come readily when called by name and sit on my hand with great confidence.

I still have him, as all of my readers know who have access to the picture sections of the Sunday newspapers. I may say that I have never got over a feeling that he sometimes tries to talk to me! Of course, his lips are not capable of human speech in a literal sense, but he often sits on the table beside my typewriter and stares up into my face with such wistfulness that I have to stop and pat him gently. I sit and stare back at his small, deep-set gray eyes for minutes on end. They look at me as though they were trying vainly to remember some long-forgotten secret. I am very gentle with him, for after all, he may be the descendant of a higher race than my own.

But to conclude our voyage: Haworth and Bill were occupied with some mechanical contrivance for weeks on end over at the work bench. Jack spent his time soberly over his chemicals testing samples of rock and earth he had brought with him from our valley. He was much puzzled by a sample from the rocky surface of Phobos. It is extraordinarily light for its bulk and its analysis, he said, would have to await his return to laboratory facilities on earth. Mason's work, like all astronomical studies, continued without end and this also meant that my time was fairly well occupied making photographs under his direction.

Altogether the three months' voyage through space was a time of quiet and restful occupation. Finally the earth began to loom larger in the telescope glass and the moon was to be seen—our own Luna—and we came to the final thrill, in some ways the greatest thrill of all. Mason called us excitedly over to him as he stood watching the periscope screen.

"A small dark thing just moved out from behind the earth! Look, there it is now—can you see it?"

We were coming close in by now and had passed the orbit of the moon. Our own earth almost filled the glass before us and a roundish dot of black moved slowly across its surface, growing rapidly larger as we looked. We were plunging down at ever increasing speed and in a few hours we could observe what we all knew could only be another rocket-vessel!

"Is there any way we can signal her?"

"None! We did not bring a radio with us."

"If we pass close enough, one of us could climb out on the *Asteroid's* hull and wave a flag in Morse code," I suggested.

Mason, as the best telegrapher of the party, was elected to the post and he donned helmet and fastened a pillow case neatly to a stick and vanished into the air-lock. The rest of us clustered around the two observation screens and gazed breathlessly at the stranger. At the instant when it became evident we would come within twenty miles of her, our huge speed became realized and the stranger loomed suddenly larger and then swept by, we following her in the glass. She also had a man seated astride her hull signalling with a flag.

"P l a n e t o i d a h o y,—(Bill read as she swept breathlessly by and away)—t h e m o o n s h i p F r a n c e h o n o r s y o u !"

And she was gone.

Of our landing off the California coast I shall say nothing. I can add not a word to the voluminous descriptions of our welcome at San Francisco which filled the public press with black type and drowned the very ether in verbiage. My story is over, reader, and I am heartily glad of it for the labor of writing is no trifle.

Epilogue

● In spite of the sad fate of the French ship (it crashed on the moon's surface) that had so bravely greeted our return to home territory, I have seen with these eyes the first incident in what I am sure will prove a new era of travel. I have seen two ships loaded with human beings pass each other on the trackless bosom of space, bound toward distant planets. That is the beginning, at least. If I live to see dozens of spacious liners leave weekly for Mars or Venus, the change will be merely one of proportion. I recently attended the impressive funeral of the French space travellers at Paris and talked to Captain Schmidt of the German rocket which brought back the bodies. They found a very promising vein of uranium—enormously rich, he said—and he plans a return trip to the moon to mine it.

I believe him. But I do not crave a place in another expedition. The old earth seems so unfamiliar to me now that I feel the need to study and examine her all over again, as though I were new-born. The handsome annuity which the United States government granted to all five of us has removed financial worries from our minds.

Mason and I still live together in 86th street, with occasional prolonged visits to Haworth's place in Connecticut. Jack drops in on us once in a while, but he is busy these days getting ready for a space test of a new and larger ship the American Interplanetary Society is building. It is designed to land on Mars and to carry two dozen volunteer colonists and their supplies. Strangely enough, Haworth is not even interested in the ship, although it is based on his own designs. He seems to have an entirely new interest which he is pursuing with Bill's help and, as usual, he will not tell us what it is all about.

I am looking forward to the day when our valley up on Mars is colonized and the insects destroyed and the mystery of its ancient civilization brought to the light of day. I have a feeling that we will learn something that is vital for mankind, now in these troubled years of transition, to know. We may obtain knowledge that will enable us to avoid that doom which pursues every race in its latter end—a doom that spells the fall of man from his high place as lord of creation.

God speed the lesson from Mars!

THE END

Escape from Phobos

(Concluded from page 697)

Darkness merged into phosphorescent light which glowed from the ceiling wall. He met no one, for which he was glad. It was his burning desire to free himself from the gloomy labyrinth—to find daylight once more. Thoughts of the prison guards became secondary to this living nightmare of which he was a part. His legs seemed cramped, and he made his way slower than at first. His breathing came hard. The slant of the passage was steep.

The tunnel came to an end. Above him, Hantel saw one of the cult's cleverly arranged doorways. It was closed, but feeling around, Hantel found the controlling trip. He pulled it. An intense light smote him from above. Instinctively, he drew back from the bright glare of daylight. Bewildered for a moment, he looked out upon the cliff top. Scrambling from the opening, he obeyed his initial impulse. He ran.

● He tripped on a stone not far from the edge of the cliff and fell panting in exhaustion. His gaze fell upon the outstretched hand clutching the electric pistol. Hantel gasped, his mouth opening in astonishment and incredulity. His hand was withered, gray and mottled, the veins standing out prominently. Then he caught a reflection of his face in the pistol's polished handle. He cried aloud, while consternation and bewilderment gripped his heart.

"That—that's not me!"

The voice was tremulous. It cracked at his display of emotion, matching well the visage mirrored in the metal handle of the gun. Watery eyes peered from a wrinkled face—the face of an old man, his head crowned with gray hair. He stared down at his clothes—the same ragged tatters which had survived his wild flight through thickets.

That blue mist in the chamber he had entered! Sudden realization smote Hantel and left him stunned! In a frenzy, he beat his head to arouse himself from this awful nightmare which the influence of the Asurians had thrown over him. But it was no use. Hantel knew it to be cold fact rather than illusion. In his attempt at escape he had sought refuge in one of their aging chambers. It was in these places that the infants of the cult, fresh from the biological laboratories, were grown to adults in a short space of time.

The super-rays from the azure mist had forced his living body through a rapid change of life by concentrated environment and the swift revolution of cellular metamorphosis. He was an old man.

He wandered dully over the cliff top on aching, rheumatic limbs which protested against the long climb he had taken up the slanting tunnel. Hantel failed to see a gray figure in a concealing hood slip up out of a crevice behind him. The color of the robe and cowl matched the gray rock so perfectly that the fugitive imagined himself alone upon the cliff top. He did see a space ship swing down from the sky, however, and head for the cliff.

The gray clad figure also saw it and he slunk back into the crevice once more. Smoldering eyes watched both man and approaching space ship. Hantel's heart sank. To cap his misfortune he was to be taken back to Phobos and executed. But he welcomed it in preference to the vengeance the Asurians held in store for him. Escape was not for him. Fate had been cruel.

The space ship came to rest a short distance from where he stood. Hantel shoved the electric pistol in his pocket. All the fight seemed to have been taken out of him. Armed guards leaped from the ship and ran toward him, holding their guns ready. They were coming to get him, he knew. Surprise showed in the face of the guard who came running up to him. The others followed.

"Why—he isn't the prisoner!" came the startled exclamation.

Hantel's surprise was just as great as that of the guard. The man had seen him many times in his daily round of duty. It suddenly struck Hantel that the aging chamber of the cult, besides robbing him of middle age had also given him an effective disguise. Hantel wondered if the other guards would know him. The next question settled any doubts in Hantel's mind.

"What are you doing here, old man, so far from the settlements?"

"I—I'm lost!" croaked the ancient. "I want to get back to Fomar!"

"Fomar? You certainly went a long way to get lost. Fomar is a thousand miles west of here."

"My flyer crashed," explained Hantel. "That was ten days ago. I escaped uninjured."

"Why didn't you signal for help?"

"Equipment was all busted when I hit."

"I didn't know they issued operating licenses to men as old as you are," observed the guard, seemingly unconvinced. "You're eighty or better if you're a day."

"I flew without a license," lied Hantel, confessing in a sheepish manner. "For the past ten days I've been heading back to Fomar."

"You're too old to travel even a tenth of that distance on foot!" the guard exclaimed. "We'll give you a lift."

"Where to?"

Hantel failed to mask his sudden concern. If the guards noticed it, however, they misinterpreted it.

"Why to Fomar, of course."

"By the way, did you meet anyone around here lately?" queried another of the guards. "A man escaped from the moon the other day. We believe he's hiding around here somewhere."

"I haven't seen a soul," Hantel replied.

In company with the guards, he walked back to the space ship and entered. He had gained freedom from justice and execution, but fate had exacted a tremendous price, Hantel well realized. The greater share of his remaining days had been forfeit. But even the few years left him were better than certain death. He might enjoy those few remaining years of old age in peace on the Martian world.

Piercing eyes watched from beneath a gray cowl as the space ship took off towards Fomar. Had Ern Hantel known the thought existing in the brain behind those eyes, he would not have regarded his future so philosophically. The power of the Asurians often reached far.

THE END

The Eternal Dictator

(Continued from page 689)

spray gun out of a sleeve, held them covered.

"The secret, Kyle, or you die and your friends with you."

"You shall never have it," Kyle spoke calmly.

Kels and Davenant acted simultaneously, even as the spray gun belched its deadly pellets. Sideways and downward they flung themselves, dynol pistols barking.

Melius jerked under the double impact, then his body ripped apart into a thousand tiny fragments.

Kels sprang to his feet exultantly.

"The Dictator is dead; long live the—"

The words died on pallid lips.

Gordon Kyle and all his comrades of the comet were writhing on the ground, flaming with the deadly *arnon* fluid.

Professor Kyle caught his horror-struck eye and smiled.

"I never wished for immortality. I am glad to go."

Then he died.

There was nothing more to be done for the victims. Those of the crew who were still alive ranged themselves in disciplined order at the command.

Davenant turned to Kels with speculation in his eye.

"The machine that Melius used is still in the Palace."

"Too late. Look!"

Some one of the retreating soldiery, a looter possibly, had fired the great pile. It was a flaming ruin.

Nick sighed. "Oh well, old Gordon Kyle was right. Look at Melius; what it did to him."

But Kels was not listening. He was looking down at the charred body, still aflame with little fires.

"Old ancestor," he whispered softly. "You were a *man*; may your great-great-great grandson prove himself one."

"Attention, men!" His voice boomed suddenly, harshly.

The survivors of the crew sprang to rigid alertness.

"A salute to the greatest man who ever lived—Gordon Kyle!"

The salute crashed and boomed with more than royal honors, while a world of ephemerids was already groping back to a lost democracy.

THE END

At Bay in the Void

(Concluded from page 707)

controls. They were in the outer stratosphere. He swung the sun screen wide open to get the full of its gravity and cut off the gravity of earth. That threw the ship into a funnel or spiral of descent.

The wailing outside the ship rose to a scream. He set the landing controls and slumped over the control board.

There was a dash of cold water over him, a strong current of oxygen in his face. Sylvia had off her air helmet and was reviving him.

He shook himself determinedly and rose from his boards. Earth was flowing around and around not more than five miles below. But it would take half an hour to land. Half an hour might mean the loss of a thousand lives, might mean death to all on board.

He struggled into the dying, strangling holocaust inside the main salon. He reached the window where the hysterical fool had been wrenched from his sledge. He found the fallen sledge and with an explosion of new strength he swung at the cerelum window pane. A fissure let in an icy blast of frigid air.

"Air! Air!" he shouted like a man gone mad. He gulped the air like a maniac sniffing a shot of dope. Then he swung at another window.

A chilly gale howled into the ship.

Justin looked out of the next window. The ship was passing the markers of the landing field. Heading down into the yards. It was a crucial time for landing. He was needed badly at the controls. But he saw around him huddles of gasping wretched human beings, and he remembered Calcutta. They would not die if he could get them air. Let the *Meteor* crack, she wouldn't crack hard, and what was a ship to ten thousand souls!

He crashed another window. He stared through it at the millions of shouting admirers waiting beyond the wire fences of the landing field. He saw old Andrews, gesticulating from the crow's nest where he was supposed to anchor. Saw the ground crew scatter as the ship lunged. Saw them go running back as it steadied. The ship quit its broncho antics. It slid into a hover. Some one was at the controls. Machinery had not been invented which could play gravitation for a hover like that. Stolings was back—or was it Sylvia?

Sylvia flew to meet him. The little fool, she was laughing, laughing like a gleeful little imp.

"You've won!" she cried, "Won, Captain Justin Bennet! The *Rocket* is not in port. She isn't even in sight of it!"

Justin caught her into his arms and drank in air—would he ever get used to it. Won? Of course he had. but it wasn't the race with the *Rocket* of which he was thinking.

THE END

RADIATION AND ITS SPECTRUM

RAYS of all kinds have been the stock in trade of writers of science fiction since Wells wrote "The War of the Worlds," and made the all-consuming Heat Ray the weapon of the resistless Martians. Many who have followed in his footsteps have conceived new and astonishing rays of diverse kinds.

A scientific discussion of the full range of electromagnetic radiation, and what has been discovered of its nature since Newton split up white light into its constituent colors and mapped the spectrum, will be contained in the February, 1933 issue of

EVERYDAY SCIENCE AND MECHANICS

now on the newsstands. It will explain simply what is known of different wavelengths of radiation, and the properties which they exhibit; indicating what may yet be discovered in the fields but little explored. All science fiction fans should read the story of "The Spectrum."

NOW 15c A COPY

The Moon Doom

(Continued from page 709)

telescope, his other valuable scientific instruments, that had meant a lifetime of saving, Hartley had been forcibly removed from his house by a life saving corps.

And not too early. He had just reached the crowd on the land above when the tidal wave already mentioned had crashed into oblivion the entire coast.

What would come now, he wondered bitterly as he strode along the dust laden road, picking his way cautiously from the mad scramble of cars.

He knew that a frantic building of a retaining wall along the city had been begun. But would it hold? But a few feet could separate lower Manhattan from the water level already, and the coming of high tide again not many hours hence,would sweep away any but the strongest of supports.

After trying fruitlessly to get a ride on one of the laden trucks, Hartley stopped at nightfall at a roadside stand for supper. He was dog-tired and longed for a few hours' rest. It was useless to try to reach the city that night.

When his supper was over he went outside and gazed at the moon. It swelled ever larger in the heavens, and cast now upon the earth a moonlight that was like the light of a dusky day. The strangeness of it all set Hartley's blood tingling. All about him he heard excited whispers of the townfolk, gazing awefully at the bloated lunar disc.

Picking a hillside a half mile away, Hartley made his way toward it. Towering several hundred feet above the road it offered safe refuge for the night at least.

The June evening luckily was warm, and curling up on the grass Hartley soon fell into a deep, troubled sleep.

He awakened to the sting of water on him. Jumping to his feet, he saw with alarm that an endless sea of greenish water, in which floated debris of houses and furniture, washed twenty feet below him. Looking upward the lunar disc now ten times its former size reflected hotly from its jagged surface.

There was not a soul to be seen, on the eastward side of the island. The waters stretched unbroken toward a dull, greyish horizon. A high piercing wind whistled ominously of an approaching storm.

Looking westward, he saw miles away the winding shore road, where menaced by the enveloping waters, dot-like vehicles struggled madly. It was clear that he was cut off from the city. What would happen if this lonely hillside were isolated, and the waters rose higher, ever higher about him?

He saw at once that the moon was approaching the earth ever more swiftly. It could not be more than 100,000 miles away now. Its speed of approach would increase rapidly. It would circle the earth more and more quickly; the violence of the tides would increase. He must think immediately of escape.

Looking toward the south, he saw that the ground sloped gently away, being protected from the sea by the hill he was on. He must turn southward and try to find some means of escaping from the island.

All day he marched southward passing through villages deserted in haste. Clothing, furniture, papers, books, spread along the road, abandoned probably to save more valuable possessions. Something clearly had happened to the public temper during the night that had served to bring panic upon the island.

During the afternoon he rummaged about a house, found food and drink, and set out again.

He slept that night on another hillside, falling asleep to a raging, howling wind.

He awakened the next morning to a loud sound of voices, the cursing and screaming of battling men. Jumping up, he saw down in a valley an airplane, and about it an aviator struggling desperately against two rough looking men. Not hesitating Hartley rushed toward them. Seeing the approach of possible help, the aviator struggled more furiously. But as Hartley rushed upon them, with a club he had picked up, in his hand, the assailants took fright and with curses rushed away to disappear in the fields below.

Hartley helped the aviator from the ground.

"Hurt?" he asked.

The flyer, a young, round-faced boy grinned. "No, thanks to you. But they had me going for a while."

Hartley glanced practically at the plane. "Yours?"

The boy nodded. "My name is Witherspoon. Was on my way to the family estate out yonder, when I developed engine trouble. Had to land, and had the trouble practically fixed when those brutes jumped on me and insisted that I take them to the city. When I said that the city was under water, they demanded that I take them to safety. I would have helped them," he smiled, "but I told them I had to go home first. Then I saw clearly from their expressions that they meant to steal the plane, I told them to go to—. So they jumped me."

"You mean the city is under water," Hartley said.

"Up to its neck," the boy replied grimly, "About a hundred and fifty feet at least."

"Where are the people?"

"Mostly evacuated. Many of them are hanging onto the large buildings. Fleets of ships are plowing over the city rescuing them. Imagine that, ships riding up Broadway, rescuing people from twelfth story windows."

Hartley nodded. "Don't you think we ought to help? Isn't that more important than rescuing your family belongings."

The boy nodded thoughtfully. "I suppose you're right. But we must find some fuel first."

Hartley put out his hand. "Suppose we join forces."

The boy took the hand. "You look O.K."

The rest of the afternoon was spent in digging some cans of fuel from the wreckage of a nearby gasoline station and supplying themselves with food to last for three days. When they had satisfied themselves they returned to the plane, and were soon speeding toward New York.

Slowly, like a gigantic gargoyle the moon rose in the east. Half filling the sky it seemed but a stone's throw above the earth. Etched deeply into the heavens, it was a gigantic caricature of a world.

Tearing themselves away from the fascination of the overhanging satellite, the men looked eagerly ahead toward the city. As they neared it cries of dismay broke from their lips. All of Brooklyn and Long Island were submerged, and looking north and west they saw a submerged city, from which only the spires of skyscrapers projected helplessly.

(To be continued)

Science Questions and Answers

This department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical also, to print answers as soon as we receive questions. However, questions of general interest will receive careful attention.

Our Dying Sun

Editor Science Questions and Answers:

I have read quite a bit about the sun dying, and the earth becoming cold and dead eventually. Could you tell me the truth or falsity of these statements?

Gerald Farrar,
Portland, Me.

(The sun is really dying, but so slowly that we need not have any immediate worry about it. All stars, or suns, start as an enormous ball of relatively cool gas. Such a sun is Antares, a red giant at present, 400,000,000 miles in diameter but relatively cool. Our sun, therefore, was once considerably larger and cooler than it is at present. The ball inevitably contracts under its own gravitational force, and meanwhile becomes hotter. This dual process of contraction and heating during which it becomes a yellow and then a "white" star continues until the sun reaches its zenith of heat. Then it begins to cool down again, although it continues to contract. The sun as it is now, is called a "yellow dwarf" star having passed the zenith of its career perhaps 200,000,000,000 years ago, and still in the process of contracting.

Perhaps two-thirds of the sun's life is over and it may have some 200,000,000,000 or 300,000,000,000 years left, during which it will gradually cool off. Naturally the RATE of cooling slows down as it becomes cooler.

The present temperature of the sun is about 12,000 degrees Fahrenheit as compared to some 6,000 degrees Fahrenheit for a red giant like Antares and 20,000 degrees Fahrenheit, the heat of the sun at the zenith of its career.

The illustration accompanying shows a chart, a rough chart, of the probable life history of the sun.—*Editor.)*

The Beginning of Life

Editor Science Questions and Answers:

Am I asking too much to enquire how life began on the earth? If so will you tell me what you can about it through your stimulating "Questions and Answers" department?

Clyde R. Dearborn,
St. Louis, Mo.

(We have been given a large order. What we can do however, in the absence of any definite proof, is to give some of the various theories regarding the origin of life on the earth, and what evidence exists for them.

The first is the religious or biblical origin that life was spontaneously created by a superior being. We will pass this over, since we have no proof whatsoever of its truth.

The second theory is that life came from the outside, probably wafted to the earth on meteors or spores. This might be true, but if so we are still up against the problem of how it was created on its former abode. That, we judge, is the primary question troubling our correspondent.

A third theory is that "life is a disease that attacks matter in its old age." In other words life, or protoplasm the material of life, is naturally formed when matter "decays." This theory was put forward by Sir James Jeans in his "Universe Around Us." Aside from its vagueness it seems to be fundamentally in error. Matter, originally, we understand was simply protons and electrons existing precariously in excessively hot suns. Some of these combined when the suns cooled, to form simple elements such as hydrogen, nitrogen, etc., and then gradually built up more complex materials, inorganic compounds such as carbon dioxide, water, etc. Gradually the whole inorganic world of liquids and metals and gases were formed. Now life, organic life, is supposed to have arisen AFTER these inorganic compounds were formed. Life therefore represents not a decay but a higher synthesis of matter, a more complex form. Decay would seem to be in the other direction; that is, when life decays it tends to break down into the simple elements, carbon, hydrogen, nitrogen, sulphur, etc., from which the universe was originally formed.

A fourth theory is that "life will be formed from inorganic materials whenever the conditions are right." Now it is possible that sometime in the past the conditions were just right and the first life was formed; and that all life afterwards is the product of that original life. Of this J. Arthur Thomson, one of the greatest of living naturalists, has the following to say in his "Modern Science":

"How living creatures began to be upon earth no one knows. While it must be admitted that a convincing scientific description is still awaiting, the favorite suggestion in scientific circles is that living creatures emerged in some secret spontaneous way from non-living materials. It must be admitted that there is not any hint of this happening nowadays, but this does not warrant us in saying that it may not have happened long, long ago. When living creatures make an unexpected appearance today, like living maggots in a dead bird, it can be shown that the young got in from the outside. Every living creature arises from some other living creature of the same kind. We confess we cannot tell as yet how living creatures came to be upon earth or in the waters under the earth.

"We are brought to the possibility, that the first organism may have arisen from non-living matter—from specks of nitrogenous carbonaceous jelly naturally built up in some quiet pool in the light of the sun.

"Experiments seem to show that light shining on water containing carbonic acid may bring about their union, the result being a simple carbon compound called formaldehyde. From that starting point with the help of more light, it is possible to build up sugar (an organic compound) and we know this is always being formed by green leaves in the sunshine.

"When there is a thunderstorm the electric discharges may bring about, in the damp air, a union of nitrogen with hydrogen and oxygen and there may be a production of nitrite of ammonia, which the rain might bring down to the pools. Let us suppose that the rain brought nitrite of ammonia down into a sunlit pool where formaldehyde was being formed. This might capture the nitrite and form 'amino acids' which in combination form proteins, like white of eggs and casein of milk, which are the main constituents of living matter." More complex forms of life might have evolved from this humble beginning.

However, given plenty of time and determination, the many scientists now experimenting with various conditions in numberless laboratories, will one day be able to duplicate the original combination, and life will be artificially created. To what end this might reach, we cannot guess.—*Editor.)*

(Continued on Page 738)

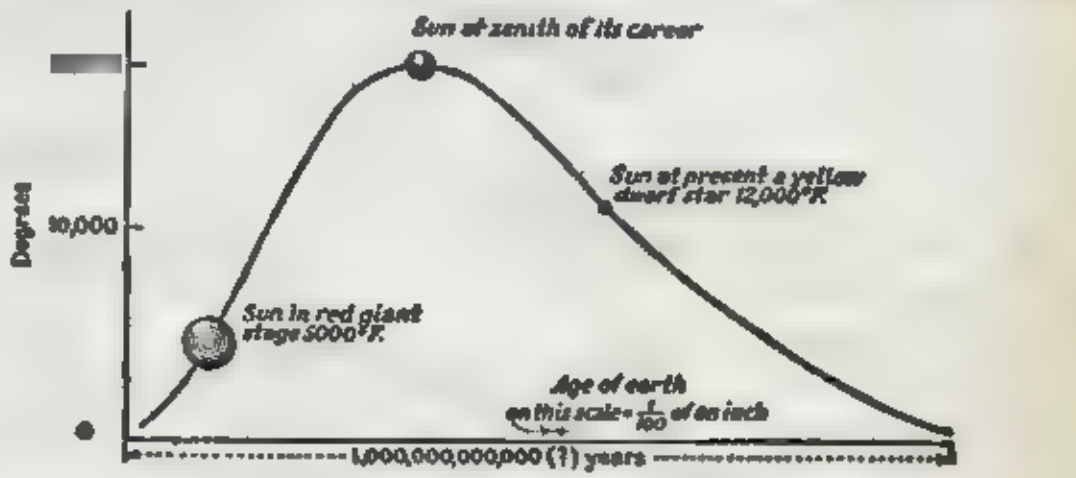

Sun at zenith of its career
Sun at present a yellow dwarf star 12,000°F.
Degrees
10,000
Sun in red giant stage 5000°F.
Age of earth on this scale = 1/100 of an inch
1,000,000,000,000 (?) years

FIG. 17.—The life curve of the sun as a typical star.

This graph, from "Man and the Stars" by Harlan T. Stetson (Whittlesey House) shows the life epoch of our sun, from the best available knowledge. The age of the earth, as compared with that of the sun, is shown. The horizontal scale is that of time, the entire life of the sun being assumed as about one thousand billion years. The vertical scale shows the temperature of the sun at various ages.

READERS

If you like "Science Questions and Answers" in this magazine, you will find in our sister magazine, EVERYDAY SCIENCE AND MECHANICS, a similar department, greatly expanded called "The Oracle." Look for it, you science fans!

IN THIS department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brick bat. All are equally welcome. All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 10c in stamps to cover time and postage is remitted.

Without Mincing Matters

Editor, WONDER STORIES:

I get much enjoyment from the stories in your magazines yet feel inclined to offer some severe criticism.

It makes little difference how grotesque one of these stories may be, nor how far the imagination is allowed to roam, but when anything which involves known laws and phenomena is concerned the story should in every case comply with these laws. It is, in other words, unpardonable to allow poor science or ignorance to appear in any of these science fiction stories.

I will call attention to some of the (as they appear to me) absurdities that have appeared from time to time.

More than one story occurred in which moisture is made to escape into the void of space. The broken fragments of a space ship are coated at once with frost. In another case a wrecked space ship which had been travelling for ages about a planet was thickly coated with ice.

Am I wrong in thinking that in outer space any moisture would be almost at once dissipated by the movement of its molecules? I have made cold water boil furiously in a vacuum. It is my opinion that water in space would act like many of our essential oils as we know their actions: or would act much like liquid oxygen. The molecules would fly immediately away unhindered by any opposing particles as is the case in our atmosphere.

In your last number a most absurd thing is described in the "Messenger From Space." Grinstead is made to pour water from a flask while on the surface of the asteroid. In the first place would a man in a space suit carry a bottle of water? How could he drink it? How could he keep it from freezing? Allowing that it was not frozen, how could he pour it? Would not that water at once explode into steam if the stopper of the bottle was removed? I advise D. D. Sharp to study more physics before writing such stories.

In the same story mass and weight are hopelessly confused. Grinstead and his fellows cannot use their weapons because they have no weight. Now it is not the weight of a club that counts, it is the mass. As I see it a blow from such an object will do as much damage in a vacuum as in air or rather more, and with the absence of gravity the blows would be equal on the average. Of course gravity helps a downward blow but hurts an upward blow.

That story without mincing matters is full of terribly poor science.

In the "Synthetic Entity," same number of January issue, a very able professor who leads the world in his line is so stupid that he cannot destroy that entity while it is about the size of a bushel basket. Why did he not put a kettle of water on the stove and, cutting off pieces of that entity, throw them into boiling water? Or why did he not at once get an oxy-hydrogen blowpipe at work upon that entity? He could cut off pieces and feed the pieces to the goldfish.

That was a good story but badly marred by the stupidity of that professor. Yet he does offer himself later as a sacrifice.

Then there was the story months back where an inventor contrived a gravity shield and mounted it in his automobile. His friend saw him make a trial and when the shield was put into operation the travelling automobile at once disappeared.

That author did not allow his mind to carry the fact that the earth would rotate under that automobile. The car could not possibly fly off instantaneously at a tangent. At the end of a second it would be only a few inches from the surface of the Earth. The friend could have watched for several seconds the gradually departing automobile.

I urge you Mr. Editor to admonish your authors that they should keep poor science out of their stories.

Allen Latham,
Norwichtown, Conn.

(With acute observers, such as our present correspondent, ready to catch up erring authors, it behooves the scribes to watch their steps. Poor science should be inexcusable, yet like the ill wind, it serves some purpose. For it enables our watchful readers to sharpen their brains upon the scientific aspects of a story and to see if they cannot find the errors involved. If they succeed in doing this the authors must suffer, and justly. Our feelings in this matter are all on the side of our readers.—*Editor.*)

Illuminating the Moon

Editor, WONDER STORIES:

In the last paragraph of the editorial, "Wonders of the Commonplace" in June WONDER STORIES, you quote a German professor on the impossibility of illuminating the moon by a searchlight from earth. But why shouldn't a powerful searchlight light up a small restricted area of the moon? The total star light, vast as it is, is largely diffused and very weak.

On a starlit and moonlit night a motor car or searchlight will illumine the ground at a long distance. It also contends with the total illumination of all the stars combined—it is purely a question of relative force and distance.

Vic Filmer,
Stapleton Road, Tooting, Bec,
England.

(The question is indeed one of relative force and distance. The diffusion of even the most powerful searchlight over 240,000 miles would be enormous, particularly because our atmosphere makes the concentration of a beam of light practically impossible. If a searchlight ten or twenty miles in diameter could be constructed with a tremendous amount of power behind it, we might get a faint flicker of light on the dark side of the moon. But to get any reflection of light upon the moon that would, let us say, compete with the sun, would be a gigantic undertaking, whose purpose it would be difficult to justify.—*Editor.*)

ON LETTERS

BECAUSE of the large number of letters we receive, we find it physically impossible to print them all in full. May we request our correspondents, therefore, to make their letters as brief and to the point as they can; as this will aid in their selection for publication? Whenever possible, we will print the letter in full; but in some cases, where lack of space prohibits publishing the complete letter, we will give a resume of it in a single paragraph.

The Two Me's

Editor, WONDER STORIES:

Allow an English reader of your journal to congratulate you on the class and type of stories you publish.

Secondly, I congratulate the imagination of artist Paul, who draws tolerably well and is really original.

Thirdly, I deplore the lack of scientific knowledge as shown by authors who write time travelling stories. Apparently anyone who travels into the future is insulated by his machine or another time travelling device against death. Let us reverse and picture and travel into the past. I am nearly 32 years old and was born on November 26, 1900.

Now let us suppose that I have invented a time traveller and start on my birthday. Now I shall travel into the past by 32 years and stop my machine. I leave same standing and in that year (1900) I shall call at 102 Virginia Road, London, where I was born. I shall see my father walking about in anxiety and my mother shall give birth to myself. I shall watch myself being born and then I shall commence to take care of the younger edition of myself, and see we make the same mistakes as I made in my youth.

Who am I? Which is the real I? We were both born on November 26, 1900.

Ivor I. Harts,
Upper Clapton Road,
London, England.

(There is much justification in what Mr Harts says. It is now up to the professional time travellers to defend their devices for exploring the past and the future. However, we have an idea that as a man goes back into the past his identity will merge with his past identity. He will be like a motion picture film being run backwards.—*Editor.*)

Blood and Corpuscles

Editor, WONDER STORIES

The cover of the November WONDER STORIES was interesting in more ways than one. After reading the editorial, I experimented with the magazine and found it just as you said—greyish blue. But I also found something else. Under a glass of about 1½ magnification your cover becomes stereoscopic. The blue dots are on one plane and the red below them, and the yellow at the back. In the foreground are the designs which, if examined closely, also appear three-dimensional. And it struck me that those three dots have a remarkable similarity to stained corpuscles or sections as viewed under the microscope.

The tiny dots you speak about give the appearance of tissues somewhat pulled apart, as is caused by the making of a slide. And the thin sections are half transparent as are your stereoscopic dots. The blot of blood in the center as at distance of about 200 feet begins to look orange, as a combination of red and yellow.

Thinking perhaps you had overlooked this striking peculiarity I have called your attention to it.

Robert Barnes,
Williston, N. D.

(We are indeed glad to know that the cover presents so many possibilities.—*Editor.*)

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LIST OF PLATES

Plate I. Nude Adult Female
" II. Nude Adult Male
" III. Nervous System of Female
" IV. Skeletal System
" V. Muscular System (Posterior)
" VI. Muscular System (Anterior)
" VII. Vascular System
" VIII Respiratory System
" IX. Digestive System
" X. Male Genital Organs in Detail
" XI. Female Genital Organ in Detail
" XII. Cross-Section of Pregnant Female Body with Child.

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THE READER SPEAKS

Mr. Smith to Mr. Miller

Editor, WONDER STORIES:

Mr. Miller's very able and urbane letter in the December issue makes me feel that my own recent letter on the problem of realism versus fantasy might be supplemented and qualified by a few remarks.

First of all, it should not be inferred that I have the least desire to prescribe limits for the development of science fiction or any form of fiction. On the contrary, I believe that all possibilities should be sounded and explored. When I decried realism in my letter, I was inveighing mainly against what I see as the limiting and sterilizing influence of a too slavish, uninspired literalism in modern writing. It did not, and does not, seem to me that science fiction would benefit by the adopting of such fetters—or, to vary the image, a clipping of the eagle's wings to a conformity with those of the barnyard fowl. Such literalism, as in the case of Zola, is the most quickly outmoded of literary forms. On the other hand, I do not think that the genuine, imaginative realism of Hardy, including an ever-present apprehension of the cosmic mysteries and fatalism that environ life, will ever be outmoded.

Also, in my letter, as Mr. Miller implies, I was considering ultimate artistic values, and not the question of expediency. Undoubtedly the realistic wave is entering science fiction, and the trend will have to work itself out. Like all other trends, it has both good and evil possibilities. I have merely tried to warn against the evil ones. The best possibilities lie in the correlation of observed data about life and human problems with inspired speculation as to the unknown forces of cosmic cause and effect that undoubtedly surround and play upon life. The evil lies in a meaningless Dreiserism, an inartistic heaping of superficial facts or alleged facts, which, after all, through our perceptional limitations, may be erroneous, or, at least, too incomplete to permit the safe drawing of dogmatic inferences.

Tomorrow, the accepted theories of science and human psychology may be superseded by a brand-new lot; and it is partly because of this shifting, unstable ground on which the thing called realism stands, that I regard pure, frank fantasy as a more valid and lasting art-expression of the human mind.

In one sense, fantasy of one kind or another is about all that is possible for us, handicapped as we are by a partial and lopsided sense-equipment, and occupying a highly precarious position amid infinities and eternities whose concerns are perhaps wholly alien to our welfare or comprehension. Any true realism, it seems to me, must include a facing of this position, and not a treatment of life as if it were an air-tight compartment shut off from the unknown cosmos, and complete and independent in itself.

Mr. Miller's definition of the three main stages in literary evolution is well-drawn, I think. It may interest him, and others, to know that my own final preference for fantasy was reached through a varied course of reading that followed pretty much the outlines he has indicated. I began with children's fairy tales, went on through Haggard, Kipling, Balzac, Flaubert, France, etc. But through it all I have kept a profound admiration for Poe. My present enthusiasms include Blackwood, Lovecraft, John Taine, Machen, etc.—and, of course, Dunsany. I have also succumbed to the pervasive charm of Merritt.

To go back to the matter of realism, as an expedient for the furthering of science fiction, I must admit that I will not quarrel with Mr. Miller's viewpoint. And most assuredly I will not fling any stones or bouquets of asparagus at fellow-scribes who can win the attention of the main-guard of criticism. More power to them, if they can. I reserve the right to join the fray myself.

I am going to make a suggestion, which is, that the treatment of human "realities" through imaginative satire could well play an extensive part, as a corollary of this development. Perhaps, just at the present time, it would be more valuable than stuff done in the Hemingway vein. I could conceivably reach, I am sure, a large and receptive audience. We are badly in need of a new Swift, who could write the Gulliver's Travels of current folly, corruption, dullness and

(Continued on page 736)

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Duty of newlyweds—innocence and ignorance—purity and fullness—getting the correct mental attitude.

Description of male sex organs, and their appearance—description of female sex organs and their appearance.

Purpose of sex organs—man's part and woman's part—difference between animals and human beings in use of sex organs—legal rights of husbands—a sin in marriage—husband's and wife's attitude—wrongful advice to bride—chastity vs. passion—hymen, the teacher—the right way to happiness.

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THE READER SPEAKS

(Continued from page 731)

madness. Stanton Coblentz has done some fine things of this type; but there are vast, unsounded possibilities.

I feel like a Time Traveler, after reading Mr. Miller's quite flattering classification of my own work as being ahead of the age! Howbeit, perhaps I am merely one of those unfortunate and perverse individuals who are constitutionally "agin the Government." When fantasy is acclaimed by Irving Babbitt, and is published regularly in Harpers and The American Mercury, I may take refuge in the writing of case-histories! That is to say, if I have not emigrated to the Abbey of Thelème or gone to Mohammed's paradise in the meanwhile. Literature is a grand old merry-go-round; and like the serpent of eternity, it always has its tail in its mouth. Also, as Mr. Miller hints, there may be some additional hoops in the ringsnake.

My apologies for pied metaphors also for the Einsteinian Liberties I have taken with Mr. Miller's curve.

Clark Ashton Smith,
Auburn, Calif.

(In this literary correspondence between two of our best known and best liked authors, Clark Ashton Smith and P. Schuyler Miller, our readers (and the editor) peek in with great interest. Perhaps on such exchanges of opinion between men who are writing the best science fiction, we can determine what the trend of science fiction should be. That being the case, all of our authors are invited to join the fray and contribute their own viewpoints. And that does not mean that our readers, who are the final judges should not come forward also. In the free-for-all, perhaps we can make science fiction history.—*Editor.*)

Not So, Mr. Matthews

Editor, WONDER STORIES:

Sadness hangs like a cloud over the heads of many. Why? Because WONDER STORIES seems to be taking a power dive to lower levels. Not because of the new price but because of the weaker stories and less striking illustrations by Paul. But that's all I'll say about that. I guess science fiction is getting old.

Gable C. Matthews,
Omaha, Nebr.

(Sadness and boredom occasionally creep over the best of us and there are times when nothing seems to taste as well as it did before. The Germans give this feeling the imposing name of "*Weltschmerz*" or world-weariness. But these moods pass again, and once more things look brighter, fresher and more appealing. Isn't that true, Mr. Matthews?—*Editor.*)

SCIENCE QUESTIONS AND ANSWERS

(Continued from page 733)

Dr. Hirsch Protests

Editor Science Questions and Answers:

In your November issue of the WONDER STORIES, under the head "Science Questions and Answers," Mr. Thomas W. Fiedler, Baltimore, Md., puts you a question on atomic energy.

Sorry to say so, but your answer is altogether at fault.

You calculate the energy loosened by the kinetic energy of the electron moving around the nucleus only and then speak about one pound of mass converted into energy. Now I ask you what becomes of the energy of the protons if you rob them of their electrons?

Einstein himself now gives an altogether more reasonable way of calculating the *total* energy available by the condensing of four atoms of hydrogen into one of hellum.

The loss in mass by this process is 0.030 (4x1.008—4.002). Einstein says that every mass represents a certain amount of energy. The amount of this energy is the mass (m) times the quadrate of the light velocity (c). Thus: energy-MC². The available energy along this way of reckoning, which accounts for electrons and protons together amounts to $0.030 \times 9 \times 10^{20}$ as the light velocity is 3×10^{10} centimetres per second. An altogether different result than your way of reckoning gives.

H. E. Hirsch,
Doctor Chemical Science,
The Hague (Holland).

(We are grateful to Dr. Hirsch for his comments. We were well aware of Einstein's method of calculating intrinsic atomic energy. But we believe that Einstein had in mind the TOTAL ENERGY of matter, not realizable atomic energy. For it is just as hopeless to try to extract all of the energy in matter as it is to extract all of the heat from a body by reducing its temperature to absolute zero. However, Dr. Hirsch's analysis adds usefully to the discussion of the question at issue.—*Editor.*)

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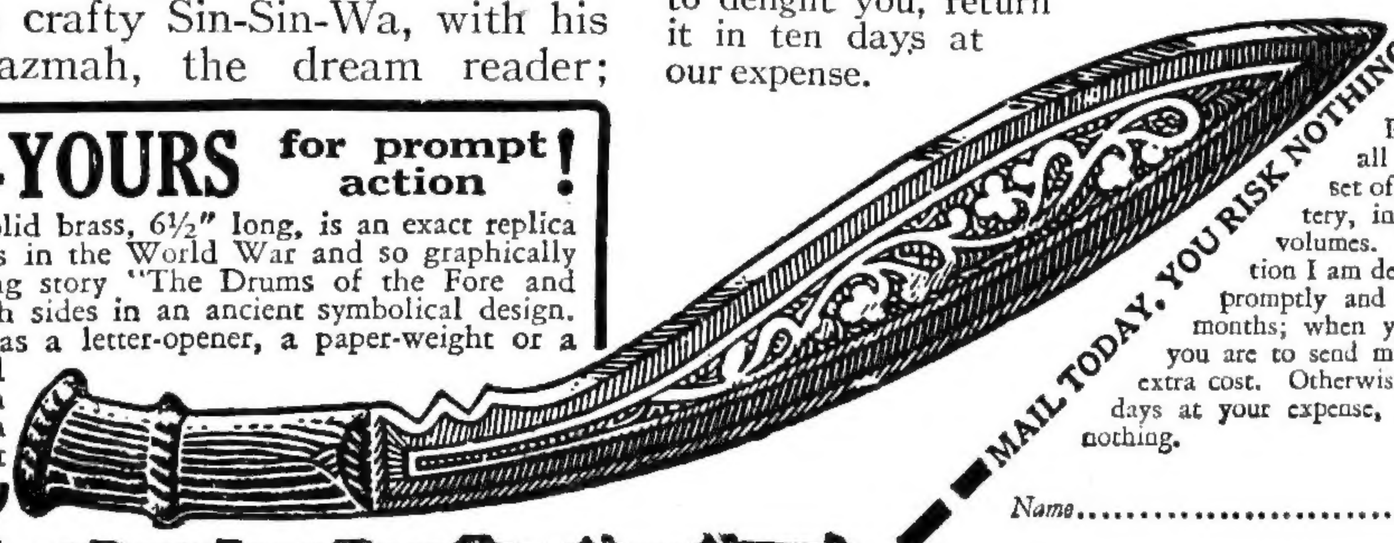

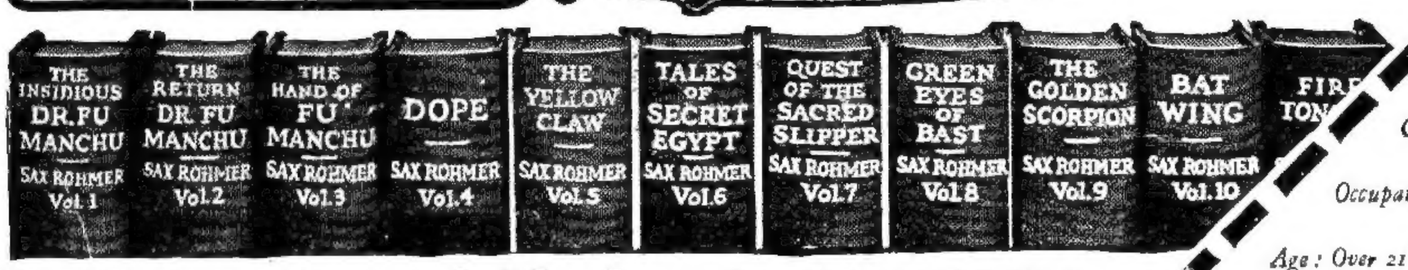

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